

COMPUTERWORLD

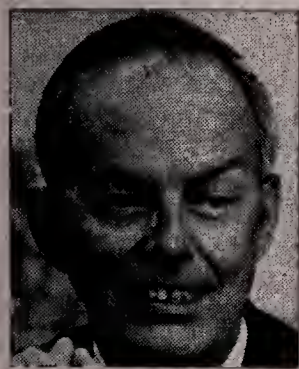
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JUNE 10, 1985

VOL. XIX, NO. 23



Crystal ball
Profile of the
Yankee Group
111



In Depth
What's up
at MCC?
Follows 72

In Depth
The right
computer-aided
design and
drafting system
for you
ID/15

Third-party service gains users' favor

By Jeffry Beeler
CW West Coast Bureau

Manufacturer service organizations, beware.

Systems users, take note.

After years of being widely perceived as the service field's poor relations, third-party maintenance companies are gaining respect.

The firms' newfound professionalism is evident in the quality of their customer service, which has recently shown strong signs of improving. The advances are not confined to one or two key measures of effectiveness. On the contrary, third-party maintenance providers have elevated their performance levels across the board, according to Rebecca Segal, a research analyst with Framingham, Mass.-based International Data Corp.

Segal based her conclusion on the results of a recent IDC survey in which users of vendor-supplied and independent maintenance were asked to rate the quality of their systems support. In general, the third-party providers were rated quite favorably compared with their manufacturer counterparts (see charts page 16).

Between 1983 and 1984, "the improvements in the service delivered from third-party firms [were] tremendous," the study concluded. In nine of the 11 performance categories that IDC asked customers to examine, the independent companies' scores in 1984 rose 0.6 of a point or more (on a rating scale of one to five) over their respective 1983 levels.

Moreover, in four of IDC's measures of service quality, the user evaluations of third-party maintenance jumped 0.9 of a point or more between 1983 and 1984. The study called the independent firms' strides "unbelievable."

"When any industry shows improvements of [0.9 of a point]... in one year, the competition must sit up and take notice, especially with independents targeting their markets," the researchers reported.

Although manufacturers as a whole still apparently hold an edge in some key service criteria like response time, third-party providers are clearly narrowing the gap in performance. In the process, independents have finally begun to shed their country cousin image and are increasingly forcing customers to reassess their long-standing doubts about the effectiveness of independent maintenance.

Probably nowhere is the third-party sector's growing stature among users more clearly demonstrated than in the recent findings of D. Roger MacNaughton, president of Franklin Lakes, N.J.-based Business Development International, Inc. As part of a report for Frost & Sullivan, Inc., a New York-based research firm, MacNaughton recently asked 2,000 MIS man-

PRODUCT SPOTLIGHT

CAI targets data center

System links software for managing DP shop

By John Gallant
CW Staff

JERICO, N.Y. — Computer Associates International, Inc. is expected today to take aim at what may be the least automated bastion of the corporate world — the data center.

The systems software vendor will introduce a fully automated data center management system for IBM MVS environments that integrates 13 of CAI's systems offerings; a microcomputer- and mainframe-based service, support and training system; and on-line software that automates product installation and maintenance.

In a demonstration last week, CAI unveiled the automated CA-Unicenter, which features the following key components:

■ Data center management software consisting of integrated productivity packages for programmers and operations per-

See CAI page 6

Losses press Wang to lay off 1,600

By Peter Bartolik
CW Staff

LOWELL, Mass. — Anticipating its first quarterly loss since 1973, Wang Laboratories, Inc. last week dramatically accelerated its cost-cutting campaign by announcing it is laying off 1,600 employees across the board in U.S. operations and freezing salaries for six months.

One year after cresting above the \$2 billion revenue mark, Wang expects to post a fourth-quarter loss for the period ending June 30, although the company said it expects to report a profit for the fiscal year. In the fourth quarter of fiscal 1984, Wang posted its highest quarterly profit ever — \$73.7 million. In the third quarter of the current fiscal year, profits slumped to \$17 million.

The declining sales problem that has stymied the company in the current calendar year has resulted in accumulations of inventory that will require Wang to write down the value of that inventory at the

See WANG page 10

TOP OF THE NEWS

Specter from within. A Data Processing Management Association-sponsored study showed that most computer crime is perpetrated by insiders. **Page 2.**

To the soul of the matter. Kinney Shoe reorganized its data collection to produce more timely top-down reports for key executives. **Page 4.**

IBM's modular CPU for a bank's remote locations headlined the American Bankers Association's annual automa-

tion meeting. Meanwhile, some 400 IBM sales reps were at the show. **Page 11.**

Tandem Computers unveiled five E-mail facilities to broaden its long-range product strategy. **Page 15.**

Death, taxes... and software maintenance. In the DP world, maintenance is an unavoidable need, although it is not always treated with due respect, said maintenance expert Nicholas Zvegintzov in a *Computerworld* interview. **Page 47.**

Cray-2 Unix supercomputer out

By Tom Henkel
CW Staff

MINNEAPOLIS — Cray Research, Inc. last week formally announced the Cray-2, a \$17.6 million, AT&T Unix-based supercomputer that is said to deliver six to 12 times the performance of the company's first product, the Cray-1, while occupying about half the floor space of the more recent Cray X-MP.

The brainchild of inventor Seymour Cray, the Cray-2 appears to be the company's attempt to fend off intense competition from Japanese computer manufacturers to offer the fastest computer system in the world.

Cray users viewed the Cray-2 introduction as an attractively priced system that will have the most appeal to supercomputer users operating with large data bases. The adoption of Unix by Cray was

See CRAY page 8



Inventor Seymour Cray with the Cray-2

NEWS

Crime survey indicts 'insiders'

By John Desmond
CW Staff

PARK RIDGE, Ill. — Company insiders commit far more computer crimes than outsiders do. Few computer crimes are reported to authorities. And fewer than half of all companies have part- or full-time staffs devoted to system security.

Those were the key findings of a survey of Data Processing Management Association (DPMA) members conducted by Detmar Straub of the management information services program at Indiana University, Bloomington, Ind.

Of 170 survey respondents, 21% reported that one or more system abuses occurred in the past three years in which the perpetrator was known. Of these, 2% were committed by outsiders. Individuals who committed inside abuses were programmers, systems analysts, machine operators and data entry clerks. Respondents were from companies in the fields of finance, retail and wholesale trade and education.

Suspected abuses

The total number of suspected abuses for which the victims had little or no knowledge of the perpetrator was "significant," Straub said. Some companies reported hundreds of suspected abuses, some dozens and some none, he said.

The largest category of computer abuse was misuse of computer services, reported by 49%. Of those, 42% involved unauthorized use and 7% involved disruption of services, such as bringing down the system. One programmer was using the company mainframe to run a mail-order business, complete with label printing. The company detected the abuse two years after it began and estimated its loss of the programmer's time at \$20,000 to \$30,000, Straub said.

Many examples were reported of DP employees using company systems to do programming assignments for night-school courses, which Straub called a petty abuse.

The respondents described 56 abuses, only 2% of which were reported to police or other authorities. Companies are reluctant to report such abuses because of embarrassment, fear of bad publicity or a disinclination to prosecute and pay legal fees, Straub said. "Banks are required by law to report

material losses, but many of them are not doing that," he said, noting that many unreported abuses at banks involved significant dollar losses.

Program abuse was reported by 24% of respondents, data abuse by 22% and hardware abuse by 5%.

Several respondents reported the presence of tapeworm programs — code that runs whenever a system is brought up and is discovered only when it purges itself. In one incident of program abuse, when a company terminated an employee suspected of wrongdoing, the employee went to his terminal in an attempt to activate a tapeworm program. Luckily for the company, the system was down at the time. The company discovered that the tapeworm program would have erased the code that the employee used to skim \$100,000 in funds into his own account.

Only 45% of respondents said they employ a data security staff. Many reported that abuses were detected by accident, rather than by auditors or security officers.

No distinct profile of a computer abuser emerged from the survey. DP managers, answering the survey as victims, reported that 27% of perpetrators acted out of ignorance of proper professional conduct, 26% out of misguided playfulness, 25% out of personal gain and 22% out of maliciousness or revenge. The DP executives said much of the unauthorized use arose from employees who used corporate information resources as personal property, in violation of company policy.

The DP managers said corporate personal computers are the biggest threat to their system security. Many said they fear users will download sensitive company data onto diskettes, according to Straub. One manager reported having nightmares of personal computer users walking out with strategic data, he said. Other respondents reported incidents of diskette theft and software copying.

Straub, a doctoral candidate in computer science in the university's Graduate School of Business Administration, said the DPMA survey is a pilot for a larger validated survey he is planning with a sample of up to 1,000 managers. "We need to have a sense of how big the problem is, and we need to identify ways to control the problem," he said.

NEWS SUMMARY

Kinney Shoe is providing information for its managers in more appropriate formats by reorganizing data collection techniques/4

DP professionals predicted a strong market for tools that automate manual processes involved in running a data center/6

Former Social Security Administration workers were charged with obtaining benefits through a computer fraud scheme/9

Geisco has reorganized its offerings to stress specialized network services, such as electronic data interchange/10

CW at NOAC: IBM introduced a 16-bit CPU for its 4700 line, targeting banks and financial institutions with remote locations . . . Micros are moving into the forefront of the banking industry's cash management techniques . . . Strong, centralized management control over micros gets concrete performance results in banks . . . Recent banking crises are prompting steps to strengthen the monitoring of cash balances/11-14

Tandem Computers advanced its long-range product strategy with the debut of five E-mail facilities/15

Although a hot topic in the industry, independent maintenance is not as popular in the marketplace/18

The FCC says customers who do not choose their long-distance carriers will be assigned to one/22

The emerging importance of program generators and software tool kits are among the trends forecasted for the software industry/24

Exxon's Exploration Division has signed a personal computer software site license — a first for the division and the vendor/25

New Hampshire's branches of government cannot agree on who should have access to the state's financial data base/28

A federal agency is using an auditing and financial system to generate additional revenue/30

IN DEPTH

MCC revisited/Follows 72

The MCC payoff/ID/9

Picking the best Cadd system/ID/15

Where are the robots?/ID/25

International Report/29

Turnaround Time/32

Call for Papers/34

Calendar/36

EDITORIAL/40

SOFTWARE & SERVICES/47

MICROCOMPUTERS/75

COMMUNICATIONS/93

SYSTEMS & PERIPHERALS/105

COMPUTER INDUSTRY/111

Random access

Wang Laboratories will pull out of most upcoming trade shows, including the National Computer Conference, sources claimed. A spokesman was unable to confirm or deny the reports immediately but did say the company has been putting its emphasis on "Wang-specific" shows. "We have been to three of those this year, and we think the payback is better," the spokesman said.

Wang is also planning to enhance Wangnet, its broadband local-area network, according to company spokesman. The company demonstrated, but has not announced, an ability to connect IBM's PC Network to Wangnet. A spokesman also claimed that Wangnet can support up to five Ethernet networks on one Wangnet band.

Lotus is planning to add macros to its Jazz program in the near future, according to a source inside the Cambridge, Mass., software company. The decision appears to be caused by widespread complaints from beta test sites about the lack of macros in the multifunction program for Apple Computer's Macintosh. Meanwhile, beta testers of the program said they are impressed with its graphics and ease of use.

Frederick and Bozena Thompson, the husband-and-wife team of California Institute of Technology researchers who developed Natural Access System software, are creating an IBM Personal Computer AT version, which they expect to demonstrate by early fall. Formerly known as A Simple Knowledgeable System (ASK), the software combines natural language capabilities, an integrated data base structure and support for modifications by programmers and end users, Frederick said. Natural Access currently runs on IBM mainframes, DEC VAXs and Sun Microsystems, Inc. workstations and totals about 2M bytes of compiled Pascal code. Caltech plans to offer nonexclusive licenses for the software.

Memorex, tomorrow morning, will formally ask the General Accounting Office for a chance to be considered in a \$14 million to \$16 million Department of Defense contract for IBM 3380-type disk drives. Memorex has all but been eliminated from consideration for the contract because the DOD's Defense Logistics Agency put a stipulation in its RFP that requires bidders to meet certain reliability standards. The standards are based on Reliability Plus, a series of programs offered by University Computing Co. The DOD set about 35 million I/O starts between failures as the minimum acceptable rate for 3380-type drives. Reliability Plus lists Memorex 3680s as averaging about 8 million I/O starts before a failure, Amdahl 6380s at about 20 million, Storage Technology 8380s at about 40 million, National Advanced Systems 7380s at about 50 million and IBM 3380s at better than 80 million. Memorex claimed its 3680 shipping schedule has adversely influenced its Reliability Plus ratings.

Memorex's major peripheral experts won't be making the trek to Chicago this July for the National Computer Conference. A spokeswoman said only Memorex's flexible disk and tape products, both of which are now marketed through parent company Burroughs, will be on display at NCC. Pleased with its Galaxy Van road show project, a semitrailer packed with display models of high-end Memorex peripherals, a spokeswoman said the company has been able to contact more decision makers by whistle-stopping around the country than by trying to buttonhole them on the floor of NCC.

WHO DUNIT

Sortland Yard warns against "Raffles-type sort programs."

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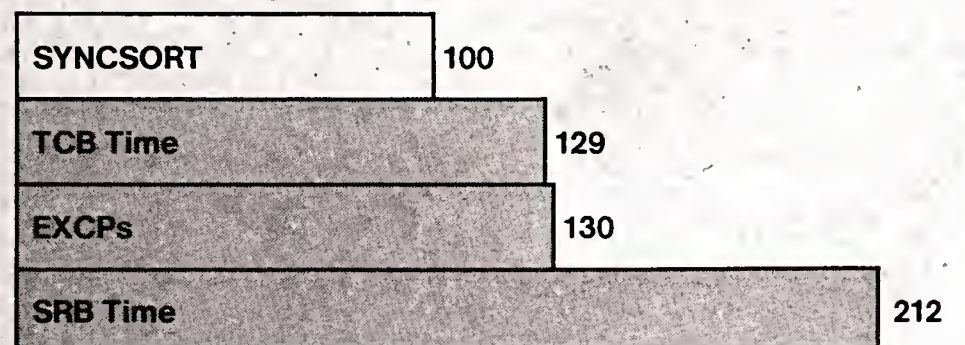
In an extraordinary move, Sortland Yard today warned data processors throughout the world to be on guard against what it termed "gentleman-bandit sort programs."

The warning was issued by one of the Yard's best known figures, Inspector SyncSort, who has sometimes been called "a legend in his own CPU time."

The inspector said, "One of the difficulties in apprehending these chaps is that they look so eminently respectable. They're members of a fine old hardware family. They've been to the right schools. And they invariably carry out their burglaries while wearing a dinner jacket from Saville Row."

EXPERT COMPUTER CRACKERS. "But once the party is underway," the inspector said, "these chaps head straight for the place where the family jewels are kept. They can crack open a computer and make off with a king's ransom in computer resources before you can say 'Hound of the Baskervilles!'"

To indicate "the true cost of this sort of misbehavior," the inspector released the following crime statistics:



DFSORT, Release 7.0

SOMETIMES TAKE HOSTAGES. The inspector noted that these black-sheep programs often "take a dreadful toll" of programmers. "They are often tied up for days on end and forced to perform unnecessary coding, compiling and debugging. And they are heartlessly deprived of the labor-saving features that are taken for granted in most parts of the civilized sorting world."

Among these the inspector listed:

- SORTWRITER
- MULTIPLE OUTPUT
- RECORD EDITING
- FAST FILE COPY
- MAXSORT

TELEPHONE BEST DEFENSE. The inspector urged data processors to call the Yard immediately if they suspect their center is infested by a Raffles-type sort program. "The number is (201) 568-9700. We'll send over one of our highly trained sort detectives to track the culprit down."

Questioned as to what would be done with sort programs caught burglarizing computer centers, the inspector replied. "They will be given a just and speedy trial. If found guilty, they will immediately be transported to Iran!"

NEWS

Kinney revamps data collection to fit managers' needs

By Charles Babcock
CW New York Bureau

HARRISBURG, Pa. — At the start of work Monday morning, executives of the Kinney Shoe Corp. in New York are finding a report on their desks that had not been there before.

It lists the previous week's sales and compares them with sales figures from the same week a year ago and with budget projections, according to Kinney management information systems administrators here.

"It's the report card for our business. It tells us how we did for the week in our stores," said Philip W. Richards, senior vice-president for finance at Kinney Shoe. Kinney executives used to get the same information two days later, but it appeared via a ponderous, store-by-store reporting system, he said.

Former system

The former reporting system required store managers to report up the chain of command. It allowed eight divisions of Kinney Shoe to state their sales eight ways, making it difficult to compare results. And since some people need information for merchandising or inventory rather than sales, much of the same data was collected at different points and entered into the system more than once, MIS officials said.

The current management report is one result of Kinney Shoe's reorganization of its data collection. Instead

of a bottom-up method, Kinney Shoe collects the data it wants at the point-of-sale terminal in each store and transmits raw data from 3,111 stores into its data processing center here, known as the Kinney Service Corp. It can then extract the information it needs for top-down reports as well as use it as grist for its regular

achievement that changes the course of the business, McMichael concedes, but it has made an impact on one group. District managers receive the week's results at 11 a.m. Sunday over portable teletype units. A quick review of the previous week can help them adjust their plans, he noted.

In addition, McMichael's staff can

where the Amish are less influenced by the fashions of popular music, to stores where demand is stronger, Ream said.

Analysis of sandal sales early in the year in the Sun Belt would indicate which styles will sell later in the North, offering guidance on which lines to mark up and mark down, Ream said.

Consolidation of data key

None of these uses would be possible, however, if Kinney Service had not found a way to consolidate its data collection.

From 1980 to 1983, it replaced a mixed bag of handwritten receipt and scanning-device cash registers with IBM 3680 point-of-sale terminals.

The terminals communicate with Kinney's mainframes here through the Advanced Communications for Storage program, an IBM telecommunications polling package. Each day at 11 p.m., the program prompts Kinney's IBM 3083 mainframe, front-ended by an IBM 3725 communications processor, to initiate a series of telephone calls over 48 lines to the store terminals. The sales for the day have been "closed" on the terminals and the data is relayed into the mainframe, McMichael said.

Data that is collected at the point of sale includes a stock-keeping unit number that identifies the department from which the sale is made, a five-digit stock identification number, a gender and size code and the retail price, including any discount.

This information is tallied on sales that average \$2.5 million a day for the eight divisions, and with it, Kinney drives its basic accounting and merchandising systems, including order picking, inventory replenishment and cash management.

Because the 3680 is programmable, additional data can be collected at the point of sale when the company has use for it, he said.

"We are now stepping back and viewing the flow of data purely from an information processing point of view."

— Richard H. McMichael
Kinney Service Corp.

batch processing, Kinney MIS administrators said.

"We are now stepping back and viewing the flow of data purely from an information processing point of view," said Richard H. McMichael, vice-president and director of MIS for Kinney Service.

Although he is part of Kinney Shoe, McMichael reports directly to executives at Kinney's parent corporation, the F. W. Woolworth Co. in New York, which is interested in consolidating management information in its other subsidiaries, Richards said.

Getting the sales report out two days earlier is not the sort of

respond to executives' requests for special information and add it to the regular report — given a week's advance notice.

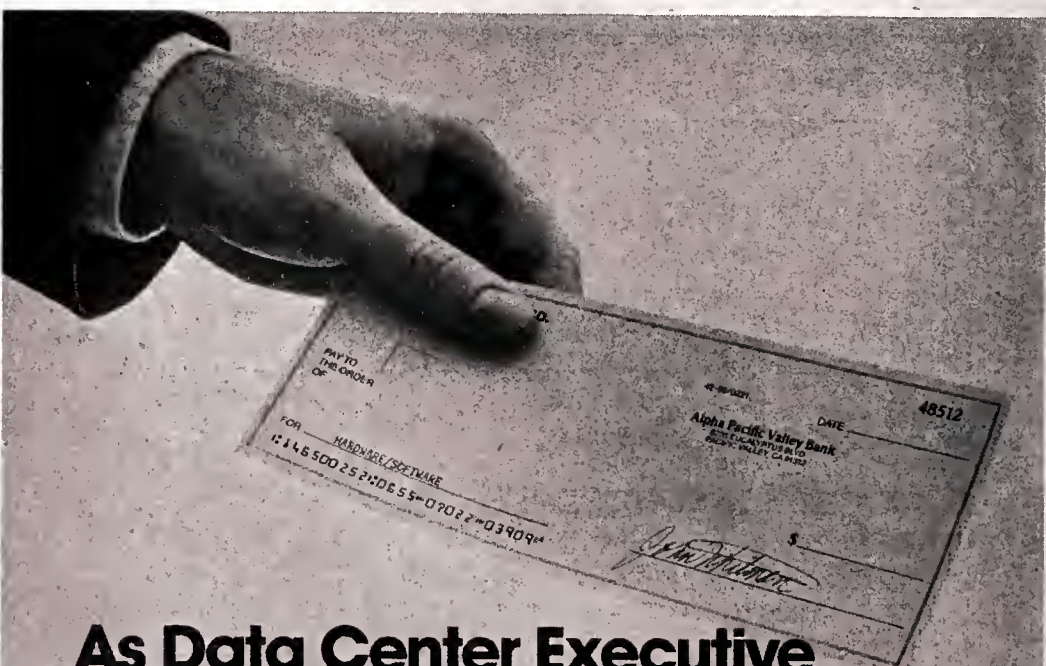
If executives are visiting the West Coast, they may want to know how Kinney Shoe stores did in the Los Angeles basin. If an advertising campaign began on the East Coast, they may want to compare sales there with those in the Midwest, said Fred E. Ream, assistant director and applications development manager.

Work on innovative use of information

More innovative uses of management information are in the offing, the Kinney officials said.

"We are looking at inventory processing at the point of sale," Ream said, and store managers would like to see computerized transfer vouchers that would allow quick transfer of goods from a store where they were not selling well to one where they were.

One of Kinney Shoe's hot sellers is a boot worn on stage and promoted by country western singer Barbara Mandrell. After a Mandrell appearance, Kinney may want to transfer boots from Lancaster County, Pa.,



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CORRECTIONS

The correct contact for the 1985 Advanced Manufacturing Systems Exposition and Conference [CW, May 20] is the Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

The three models of Data Switch Corp.'s Model 8044 channel extenders operate at 50K byte/sec., 250K byte/sec. and 650K byte/sec., not at the bit speeds originally reported [CW, June 3].

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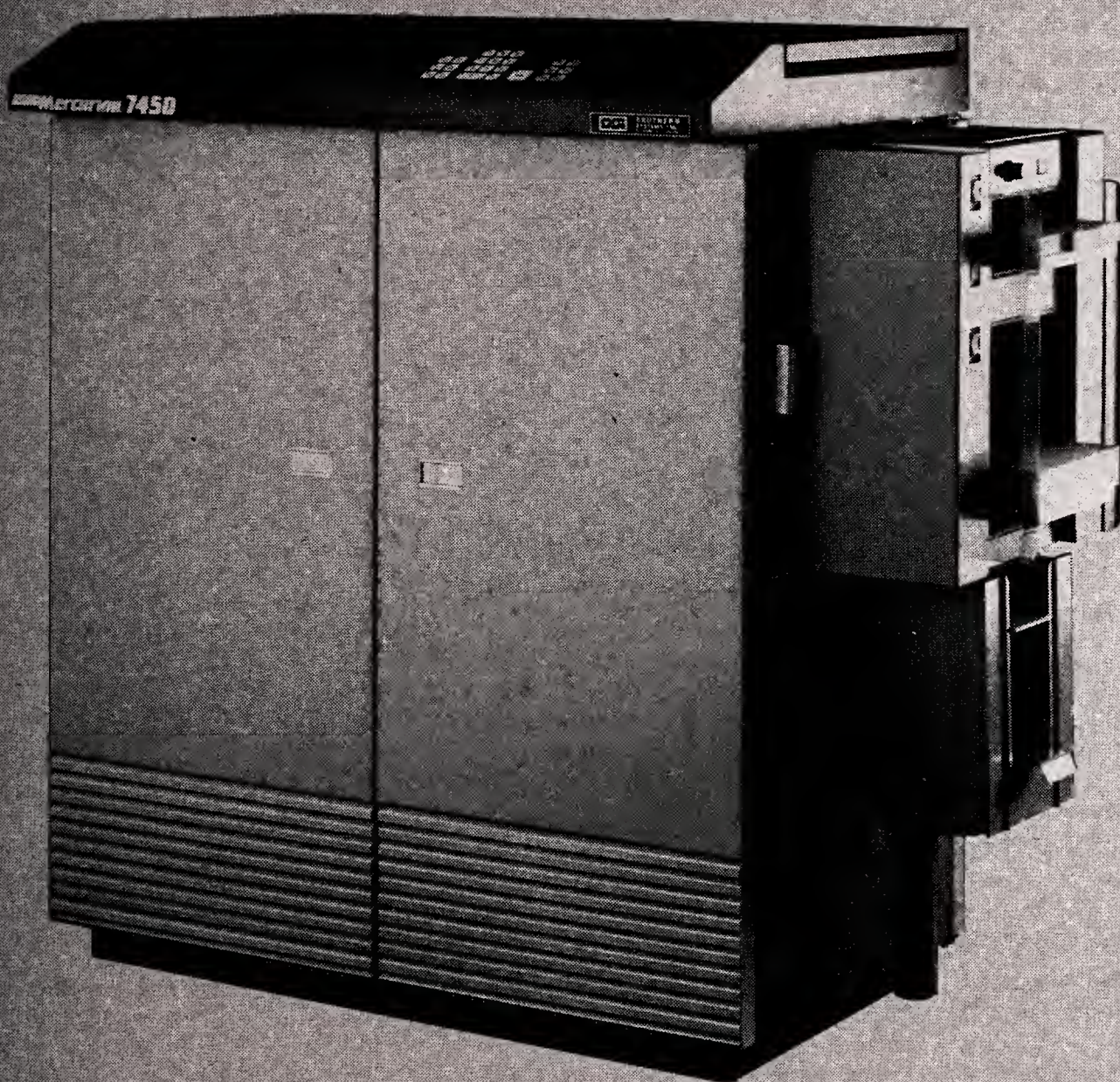


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NEWS

Users back development of automated data center tools

By John Gallant
CW Staff

With the expected introduction of its CA-Unicenter system today, Computer Associates International, Inc. is gambling on the strength of the market for automated data center tools. If the DP professionals contacted by *Computerworld* last week are representative of their peers, the Jericho, N.Y.-based systems software vendor may be backing a winner.

"In large shops with multiple CPUs, a system that automates manual operations would be of great interest," said Benjamin Fong, director of computer technology and operations for Western Airlines, Inc. in Los Angeles. The company operates four IBM mainframes, including a 3083 under VM, a 3033 and a 4381 Model 2 under MVS and a 4381 Model 2 under IBM's ACP/TPF.

"It is true that the data center is one of the least automated departments today. But the environment changes so fast that it has been hard to stay on top of automation," Fong continued. "End users are our top priority. Their needs typically necessitate changes in CPUs, software and peripherals. In the face of that rapid change, it is hard to automate."

Fong's comments were echoed by Norman MacVicar, director of systems and operations for Avco Computer Services, a division of Avco Corp., in Wilmington, Mass. MacVicar said Avco has taken steps to auto-

mate many of the former manual processes involved in operating its data center, which boasts two IBM 3033s and a 3083 under MVS and a 4341 under VM. But despite the strides the company has taken toward automation, MacVicar said there is still much to be achieved.

"Data centers are not as automated as they ought to be. Even we have manual processes that we would like to automate, such as automatic problem tracking," MacVicar explained. "There are some individual solution-type packages out there. But where the products are not available, you have to build them yourself. Data center people do not have the time to do that. We are too busy addressing other people's needs."

According to Donald Arthur, manager of operations research with Chattanooga, Tenn.-based Provident Life and Accident Insurance Co., the individual solutions available from a variety of vendors are not the answer to automated data center management. Provident runs IBM 3084, 3081 and 3033 mainframes, all under MVS/XA. The processors support a network of some 2,000 terminals, 1,200 of them remote.

"The waste and overlap involved with those multiple packages concerns me," Arthur said. "Even one vendor's products overlap in functionality. The true one-vendor solution is what I am looking for; it is the dream I pursue. But I do not see it out

there yet. In our environment, the tools have to be integrated, or they just will not be reliable."

Arthur said his company is actively seeking a reliable automated job scheduling and submission system and capacity forecasting software. "We are certainly not the least automated department in the company," Arthur said. "But we are not as highly automated as we have to become this year if we are to survive. We are losing roughly 10% of our CPU cycles because of the lack of a job [scheduling] system we can rely on. We need a system that can start scheduled jobs when required to make sure we have completed our production work in order to get our on-line systems up on time."

Even users who feel they have adequately automated their own shops acknowledge the growing need for data center management tools. Robert Best, vice-president of data systems with Toyota Motor Sales USA, Inc. in Torrance, Calif., said his company's philosophy is to ensure that its data center workers are "as well taken care of as our other users."

But, he said, "The market is waiting out there. Operational problems are usually not related to hardware or software failures. In most cases, it is a manual process that has caused the problem. Those manual procedures invite problems."

Toyota currently operates an IBM 3081 and a 3033 under MVS. Relying primarily on IBM's Operations Planning and Control (OPC) scheduling software, Best said, the data center is manned by only three workers per shift. Another three employees maintain Toyota's nationwide computer network that ties together some 1,000 dealers.

In addition to OPC, Toyota runs about 70 other software packages aimed at reducing the manual effort involved in operating the data center. Asked if he was concerned about relying on products from different vendors, Best said, "Certain companies make packages that IBM does not offer or that are as good or better than IBM products. But we are very judicious in what we select. We think the single-vendor philosophy would be the right way to go."

CAI from page 1

sonnel. Operations tools are provided for job scheduling, documentation management, performance measurement, on-line and batch job accounting, capacity planning, tape and disk management and sorting.

Programming facilities include utilities for program optimization, error analysis and detection, test and debug, report generation and file management. While each of the packages was previously available from CAI and was integrated to varying degrees, a spokesman said, they now feature common screen and report formats and function keys and a standardized installation procedure.

■ The CA-Uniservice micro- and mainframe-based service, support and training system. This component includes a hard-disk-equipped IBM Personal Computer workstation that acts as a central node between the user's mainframe software and CAI's Customer Service Center, based here. Through CA-Uniservice's micro-mainframe link, users have 24-hour, on-line access to CAI's data base for problem reporting, requests for central support, product ordering and review of support data files.

Users can search a data base of program temporary fixes (PTF) by key word, download a required PTF and apply it through the CA-Activator portion of CA-Unicenter. CA-Uniservice also provides interactive, micro-based tutorials for each CA-Unicenter component and includes management support software, including the Supercalc3 spreadsheet, the Superproject project management system and audit and reporting tools to monitor system use.

■ The CA-Activator automated software installation and maintenance system. CA-Activator is an on-line, menu-driven tool that simplifies the installation of CA-Unicenter. It runs under IBM's TSO/ISPF and can be accessed through a separate CAI-supplied micro-to-mainframe link from the micro workstation. The tool acts as a front-end processor to IBM's

Systems Modification Program (SMP) installation software.

CA-Activator, which was designed to ensure complete and standard installation of the CAI products, monitors all installation activity, defines SMP and library data sets, automatically allocates disk space, generates required JCL and submits the completed job to SMP for execution.

CAI, which earned wide recognition as a leader in systems software for IBM DOS/VSE environments, has also become one of the top players in the MVS systems software arena through product introductions and acquisitions. The company last year acquired Sorcim Corp. and Johnson Systems, Inc. and in April bought out Value Software, Inc. CAI's fiscal 1985 revenue was nearly \$129 million, an increase of more than 50% over fiscal 1984 revenue of almost \$85 million.

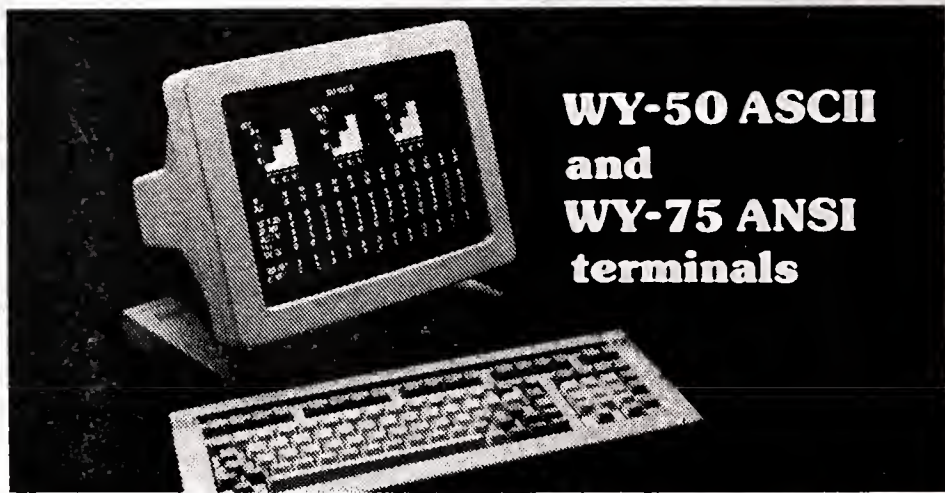
With the introduction of CA-Unicenter, CAI is betting that IBM's largest user sites are seeking to automate many of the manual processes involved in operating a data center (see related story above). Senior Vice-President David Tory said that the announcement and the company's thrust into the MVS systems software market are acknowledgments of the growing importance of MVS to IBM and its top customers.

"Our studies indicated that users are concerned about the spread of multiple vendor products and different procedures and levels of support," Tory said. "There is also a recognition that the data center is riddled with manual processes that are error prone. We have been automating all the other areas of the company, but the data center is a classic example of the cobbler's children having no shoes."

CAI said CA-Unicenter will be generally available in August. It will be priced at \$144,000 for a three-year lease or at \$188,000 for a perpetual license. CAI customers choosing to upgrade to CA-Unicenter will be offered credit for their products.

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NEWS

Cray-2 cited for scientific advancement, move to Unix

By Tom Henkel
CW Staff

A strong business move for Cray Research, Inc. and a potentially impressive advancement for scientific computing was how two researchers viewed the announcement of the Cray-2 supercomputer last week.

The fact that Cray was formally announcing a system that it already installed at one user site and the company's move to AT&T's Unix operating system were considered the two most impressive aspects of the Cray-2 announcement.

When Cray unveiled the Cray-2, it announced that it had installed one machine internally and had shipped another to the Lawrence Livermore National Laboratory's National Magnetic Fusion Energy Computer Center in Livermore, Calif.

Working product, quick delivery

According to James Bottum, a researcher with the National Science Foundation's Office of Advanced Scientific Computing, Cray's move indicates that the Cray-2 is a working product that can be delivered fairly quickly, thus giving the company an advantage over Japanese supercom-

puter vendors.

Bottum observed that there has traditionally been a lag between the time all three Japanese supercomputer manufacturers — Fujitsu Ltd., Hitachi Ltd. and NEC Corp. — announce products and when those products are available in the U.S.

"I liked what I saw in the Cray-2," Bottum said, noting that the system's large central storage will prove a boon to users with applications that involve large data bases.

Cray's offering of AT&T's Unix on the Cray-2 also drew praise from Bottum and another researcher, Michael Heath, a computer science group leader at the Oak Ridge National Laboratory in Oak Ridge, Tenn.

Heath noted that his work on algorithms usually begins on a Unix-based Digital Equipment Corp. VAX superminicomputer. Currently, he develops his applications in Unix, then adapts them for processing on the laboratory's Cray-1. With Unix running on a supercomputer, Heath said, his job would be much easier. Neither researcher felt the Unix offering would hurt users of Cray's COS operating system.

Both researchers agreed the \$17.6 million price

tag on the Cray-2 is impressive when compared with commercial high-end mainframes and other supercomputers. Heath, however, noted that \$17.6 million is still a lot of money to raise, especially for government laboratories.

He speculated the Cray-2 might prove to be more attractive to commercial supercomputer users, such as oil exploration firms or the movie and auto industries.

Reservations about fluorocarbon cooling

The fluorocarbon cooling technology used in the Cray-2 was viewed with some reservations by the two researchers.

Heath said the cooling technique was necessary to achieve the performance of the Cray-2. Bottum noted the technology was probably an interim step until gallium arsenide substrate development is perfected.

Neither researcher believed the fluorocarbon cooling technique marked a new wave in computer architecture. However, both noted that they felt the technique would function adequately in the Cray-2.

CRAY from page 1

also viewed as a positive step that will make researchers' jobs a little less complicated (see story above).

The first commercially available system to use a liquid immersion technique for cooling, the Cray-2 features an internal clock cycle of 4.1 nsec and a main memory capacity of

256 million 64-bit words (roughly 2G bytes).

It is also the first large-scale supercomputer to use a version of AT&T's Unix System V operating system, the Cray-2 Operating System. This marks a departure from Cray's proprietary COS operating system used on the earlier Cray-1 and Cray X-MP supercomputers. The

spokesman said Cray will continue to support COS but that the company plans to offer Unix on the X-MP by 1986.

Physical characteristics

The Cray-2 consists of four basic parts: a 14-col. CPU configured in the familiar Cray 300-degree arc; two pumping stations, called Pods, used to pump a fluorocarbon coolant in and out of the CPU; and a reservoir used to store 200 gallons of fluorocarbon coolant.

The CPU occupies 16 square feet of floor space, stands 45 in. high and weighs 5,500 lb. It is made up of 320 multilayer plug-in modules, each containing roughly 750 integrated circuit packages. Each module contains approximately 240,000 chips, including about 70,000 MOS memory chips. The gate array logic chips, consisting of 16 gates, use emitter-coupled logic circuitry, the vendor said.

The CPU consists of one foreground and four background processors. The foreground processor coordinates the data flow between the common 256 million-word main memory and all external devices via four I/O channels. The common main memory is divided into four quadrants with 128 interleaved banks. All memory access is automatically performed by the hardware, and any user can access all or part of this memory, the vendor said.

The four background processors are used to perform both scalar and vector calculations. Cray claimed each of the background processors is more powerful than the company's original Cray-1 CPU and includes its own 16,384 words (or 131K bytes) of local memory, which is used for temporary storage of vector and scalar data. The company said the background processors can operate independently on separate jobs or together on a single problem.

The Cray-2 CPU is divided into 14 vertical columns, each of which consists of 24 processor modules (there are 16 blank slots in the system) and a power supply. The entire CPU is filled with the liquid coolant, a chemical called Fluorinert, manufactured by 3M Corp.

The chemical is said to be a color-

less, odorless, inert fluorocarbon that is both nontoxic and nonflammable. While the coolant is costly, about \$230/gal., the Cray spokesman said the company believes the coolant will not deteriorate with age, nor will it have to be replaced.

The spokesman added, however, that Fluorinert does evaporate, and users will have to add coolant to the system periodically.

The fluorocarbon liquid is circulated through the CPU cabinet and comes into direct contact with the integrated circuit packages. The spokesman said the coolant is pumped into the CPU at 70 degrees Fahrenheit, and its temperature is elevated to 77 degrees Fahrenheit when it is pumped out. If a processor module fails, users have to pump the coolant out of the CPU and into the coolant reservoir before maintenance can be performed.

The Cray-2 Operating System is based on AT&T's Unix System V, but the kernel has been enhanced to boost I/O processing performance and to handle large data files more efficiently.

The Cray-2 was designed to use an enhanced version of the company's CFT Fortran compiler used on the earlier Cray-1 and Cray X-MP systems. Called CFT Version 2, the compiler is said to allow Cray-2 users to take advantage of the company's existing scientific subroutines.

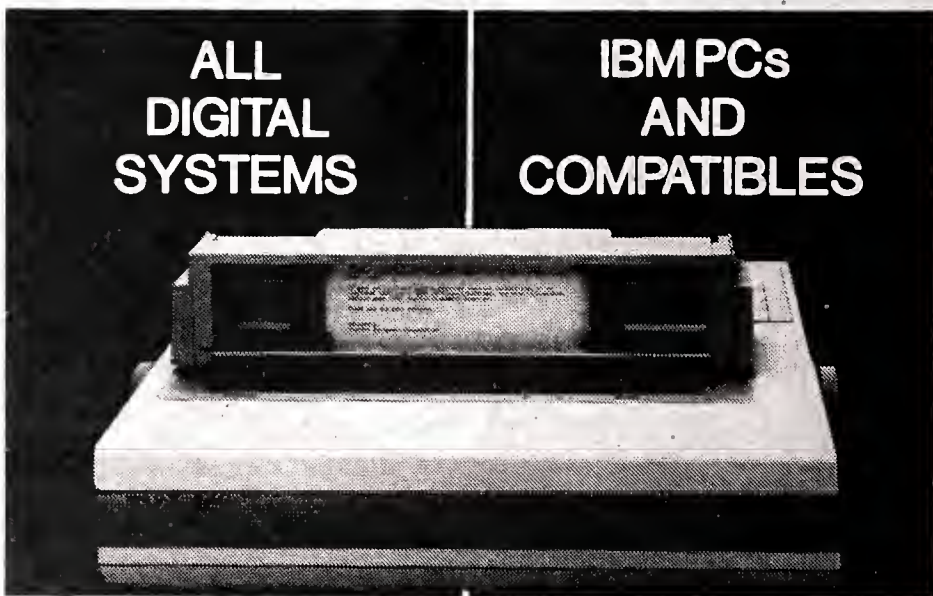
Supports C language

The Cray-2 also supports the C programming language, which the vendor said was used in developing the Cray-2 Operating System and forms the basis of most of the utility programs used with the system.

Cray said it had installed a prototype of the Cray-2 several months ago at the Lawrence Livermore National Laboratory's National Magnetic Fusion Energy Computer Center in Livermore, Calif. A second system will be delivered this summer to the Numerical Aerodynamics Simulation Program at the National Aeronautics and Space Administration's Ames Research Center at Moffett Field, Calif., the company said.

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NEWS

Two charged with computer fraud to gain SSA benefits

False entries alleged for 'large sum' theft

By Mitch Betts
CW Washington Bureau

JACKSON, Miss. — Two former Social Security Administration (SSA) workers are scheduled to go on trial July 15 in U.S. District Court here on charges that they fraudulently obtained disability insurance payments by entering false employment information into the SSA's computer in Woodlawn, Md.

A federal grand jury issued an indictment last month against a married couple, Walter S. Gandy and

Margaret F. Gandy, of Edwards, Miss.

The indictment alleged that the two defrauded the SSA to obtain benefits for themselves and two other people.

The Gandys pleaded not guilty to the charges at an arraignment last month. The defendants' lawyer, Tom Royals, could not be reached for comment.

False entries to obtain benefits

The indictment states that in 1976, Margaret Gandy, at the time a claims representative in the SSA's Laurel, Miss., office, used a computer terminal to make false entries to obtain disability benefits, according to

Assistant U.S. Attorney Henry Wingate.

Wingate said it is unclear exactly how much money the Gandys obtained, but he added that it was a "large sum."

The seven-count indictment against the Gandys included charges of wire fraud, mail fraud and making false statements to the government. Each charge carries a maximum penalty of \$10,000 and five years in prison.

Access to terminal at work

Wingate speculated that Margaret Gandy had access to a computer terminal in the course of her work as an SSA claims representative and could

make entries and changes in the files.

However, Phil Gambino, an SSA spokesman, said claims representatives do not have terminals yet.

According to Gambino, claims representatives help claimants to process paper forms. These forms are then turned over to data transcribers who enter the data into the computer.

This separation of duties prevents claims representatives from making direct computer entries, an informed source at the SSA said.

The source explained that the fraud alleged in the Gandys' case is actually perpetrated when the false information is supplied on the paper form.

Antipiracy unity urged

By Maura McEnaney
CW Staff

MONTREAL — Mention software protection to a group of worldwide developers and distributors, and suddenly you are speaking an international language.

Illegal copying of software is a problem that exists in every technologically advanced country, and each is mounting its own efforts to enforce software protection laws. "There must be a degree of international conformity in this area," said Daniel Mersich, a Canadian attorney specializing in computer law.

Speaking at the recent Montreal International Software Market, Inc. (MIM) '85, Mersich said software piracy in Canada is considered a criminal action, since it can be classified as theft.

Mersich cited several examples of Canada's efforts to control software piracy. Unauthorized copying of confidential names from a computer data base constitutes a theft in Canadian courts, Mersich said. The Superior Court in Montreal also recently ruled against a company that made unauthorized copies of a registered trademark displayed in the software and removed the publisher's name from pages of the user's manual, he said.

"Copyright law is the most effective weapon we have against software piracy," according to Brian Niblett, a Welsh attorney and author of a book on protecting computer programs. "Criminal law and patent law have a limited part to play in protecting software," while trademark laws can be only somewhat effective, Niblett said.

Although site licensing — under which companies pay a set price for an unlimited number of copies of a program — is becoming a popular concept among both developers and licensees, it is difficult to impose liabilities for contractual violations on the part of the user, Niblett said.

While copyright may be the best avenue of protection for software developers, it often needs to be combined with several contractual protections, noted Yoshikazu Takaishi, general counsel for IBM Japan, Ltd. "There is no set menu for protective measures as legal panaceas," he said.

Just published:

DOS/VSE JCL

If you want to learn to code effective job-control language for a DOS/VSE system, you've got your work cut out for you. The information you need is spread through more than a dozen IBM manuals. And because the manuals have to cover everything, the important points are often hidden by the details.

But now, a new book called *DOS/VSE JCL* saves you the trouble of struggling through the manuals. It teaches you everything you need to know to run everyday jobs...without burying you in detail. And with this background, you'll be able to use the IBM manuals efficiently when you have questions about unusual applications.

What this book covers

Part 1: Introduction The first part of this book gives you the background you need to start coding JCL. First, you'll learn about IBM mainframe hardware and configurations. Next, you'll learn about basic features of the VSE operating system, like multi-programming, virtual storage, data management, and libraries.

One of the most confusing parts of VSE to new users is that some common system functions—like interactive editing and spooling—are managed not by VSE itself, but by other program products—like VSE/ICCF and VSE/POWER. So you'll learn right away what those products are and what they do. Then, you'll learn how to use ICCF to enter text at a terminal.

Part 2: Job-control language In Part 2, you'll learn a practical subset of VSE JCL and see how to apply it in realistic job streams. You'll also learn how to code JCL to control storage, libraries, and device assignments. And you'll find out how to code and use cataloged procedures.

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Part 3: VSE/POWER Part 3 shows you how the VSE spooling program, POWER, works. Here, you'll learn to code POWER job entry control statements (JECL) to manage job scheduling and output processing. And you'll learn how to use ICCF to submit a job to POWER, monitor its progress, and get its output.

Part 4: Advanced data management In this part, you'll find out how to use the label information area to store permanent file labels, how to do advanced tape processing, and how to code job streams to process all types of DASD files: SAM, DAM, ISAM, and VSAM.

For VSAM, you'll learn its specialized concepts, plus how to use the Access Method Services (AMS) program to define catalogs, data spaces, and files. You'll also learn how to use 2 VSAM compatibility features: the ISAM Interface Program and the VSAM Space Management for SAM Feature.

Part 5: Program development and library maintenance In this part, you'll learn how to code job streams to run the VSE language translators and the linkage editor. You'll also learn how to translate and test programs interactively through ICCF. Then, you'll learn how to code job streams to maintain VSE libraries.

Part 6: Utility programs Part 6 shows you how to code job streams for the most useful functions of 3 common utility programs: Sort/Merge, DITTO, and AMS. So you'll learn how to use

these utilities to create, copy, print, sort, and merge files.

Why you should try this book...whether you're a VSE novice or expert

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NEWS

Geisco reorganization to target specialized net services

By Mitch Betts
CW Washington Bureau

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco), undergoing a major reorganization in response to a stagnant market for its traditional remote computing services, plans to make aggressive moves into such specialized markets as electronic data interchange for business-to-business orders and payments, Geisco officials said last week.

Geisco will specialize in a portfolio of electronic data interchange applications for vertical markets, such as the transportation and office supply industries, and automated clearinghouse services for banking and medical insurance transactions, company officials said at a press briefing.

In addition, Geisco officials said the company will continue to offer and enhance its packet data network service, office communications services,

such as electronic mail, and the new Dealer Talk network for communications between manufacturers and their dealers.

"There is a heightened sense of urgency to get where we need to go," said W. James McNerney Jr., who was appointed senior vice-president of marketing and U.S. sales operations, citing the business pressures on Geisco's broad-based services.

"We've got to face that reality," he said.

Results of reorganization

Last month, Geisco announced that the reorganization resulted in the layoff of about 400 workers in marketing, sales and technical positions [CW, June 3]. On May 31, Geisco sold Network Consultants, Inc., a Chicago-based subsidiary specializing in wire transfer software for banks, to Dallas-based Mtech, Inc., a vendor of software

packages designed for the banking industry.

As part of the reorganization, Geisco last week announced a series of management personnel changes. McNerney was given responsibility for marketing and sales, as well as for all of the new domestic business ventures.

Responding to questions, McNerney said the reorganization de-emphasizes certain business lines, such as single-client software packages and consulting services, that do not take advantage of Geisco's worldwide telecommunications network. "You cannot play everywhere in the computer services industry anymore," he said.

McNerney said the new ventures will produce annual growth rates of 25% to 45%, consistent with the corporate culture at Geisco's parent, General Electric Co.

"Luckily, selectivity doesn't dampen your growth rates," he said.

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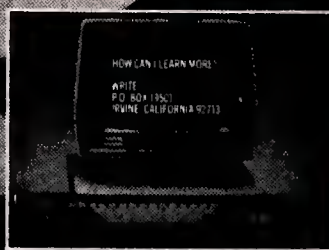
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MCDONNELL DOUGLAS



WANG from page 1

end of the quarter, the company said. Earlier this year, Wang said it would shut down production for two weeks in July.

Stephen K. Smith, a securities analyst with Paine Webber, Inc., said the company is facing a very tough situation from which it could take years to recover. "I would go so far as to say Wang has three problems: IBM, IBM and IBM," Smith said.

IBM's aggressive moves into departmental data processing with its System/36 have severely impacted Wang's sales, and the general U.S. computer sales slump and adverse foreign exchange rates have magnified the problem, according to Smith.

Wang spokesman Peter D. Connell said the layoffs, the first for the company since the 1974 recession, will "be across all areas of the company" in U.S. operations and will represent 5% of its worldwide work force. He said the slump is "mainly a U.S. phenomenon" but has impacted all product areas.

He added that sales of Wang's VS minicomputers are doing relatively well, and personal computer products are selling well in Europe.

Connell rebutted persistent rumors that John Cunningham, Wang's president and chief executive officer, will be leaving the company. "I wish I could put those rumors to rest," he said.

An Wang, chairman and founder of the company, has taken a more visible role in day-to-day operations this year, Connell said, but he added that Wang "has always been the driving force for the company; he has always been looking over the helm."

The retrenchment may serve to strengthen Wang's role in selling to MIS departments, Connell insisted. "We have focused our marketing efforts; we have hired aggressively people with special skills to reach the MIS director," he said.

But he conceded the company is directly battling IBM. "We have targeted [Wang's] capabilities in departmental data processing," he said. "That continues to be a major development area and market area where IBM has focused its System/36."

Smith said Wang has the "bright people and bright ideas" to turn things around, "but it is not going to happen overnight." Wang must broaden its product line, and in that vein, it may begin marketing engineering workstations that were developed internally, Smith said.

NEWS

IBM's 4700 financial family gets modular processor

By Tom Henkel
CW Staff

DALLAS — IBM chose last week's American Banking Association National Operations and Automation Conference here to unveil a modular CPU for its 4700 line of financial systems.

The 4702, based on a proprietary 16-bit CPU, was designed for banks and financial institutions with remote locations. It can perform a variety of financial processing tasks such as teller transactions, loan processing and automated teller machine (ATM) functions, IBM said.

The 4702 is available with 512K to 4M bytes of main memory and can support up to two diskette drives and two optional fixed-media disk drives. The 4702 supports 4700 communications terminals and other devices at branch or remote locations while providing a communications link at up to 19.2K bit/sec. to a host processor. This, IBM said,

enables terminal users to process transactions on-line and to update continually the data base in the host processor.

The 4702 can also be used as an off-line stand-alone processor for uses such as running an ATM terminal. For example, as customers use the ATM during the day, the transactions are processed and stored locally in the 4702. The transactions can then be sent overnight to a host processor, such as a System/36 or an IBM 3090 mainframe, located in the bank's main office.

A basic configuration of the 4702, including 512K bytes of main memory and a 5¼-in. diskette drive with 1.2M bytes of storage, costs \$9,900. Main memory can be expanded in 512K- or 1M-byte increments up to 4M bytes at costs of \$2,500 and \$5,000, respectively. A second 1.2M-byte diskette drive costs \$650. An optional 72M-byte fixed-media disk drive costs \$4,000. The 4702 will be avail-

able in October, but the fixed-media disk drive will not be available until December, IBM said.

IBM is offering an on-site exchange service for the 4702 and 4700 display terminals. The service costs \$215 per year for a basic 4702 configuration.

At the same time, IBM announced the 4708 disk drive, available in two capacities, for users of the 4701 Model 3 finance controller who want to store large amounts of data locally. Available in 72M- and 144M-byte capacities, up to two drives can be attached to the 4701 Model 3. Available in December, the 72M-byte version costs \$6,400, and the 144M-byte version costs \$10,400, IBM said.

Other products in the 4700 line include the following: the 4704 finance communications display station, a CRT terminal used for interactive banking applications, the 4710 system receipt/validation printer, 4715 continuous forms printer, the 4720 forms passbook printer and the 4730 ATM.

REPORTER'S NOTEBOOK

Ramblings from the floor at the American Bankers Association's annual National Operations and Automation Conference (Noac) last week:

■ "Banking is Big Blue" would qualify as an appropriate theme for this year's conference.

According to one software house, its future success is contingent on designing for the IBM environment. Of the 300 top banks in the country, 100% have IBM installations, and installations are in the high 90% range for the next tier of banks.

"Bankers won't think of making any decision other than to buy IBM. They won't take the risk. They don't have to. They are bankers," he added.

■ During the conference, more than 400 IBM representatives flooded the exhibition floor, intently poring over the latest software enhancements in the banking marketplace and eagerly awaiting product previews of enhancements to the IBM 4700 financial communications system, rumored to be based on the IBM System/36.

IBM took over a Dallas hotel for its entourage and even printed its own program.

■ Not to be outdone, Ericsson, Inc., the Swedish electronics and telecommunications firm and a new entry into the micro market with a branch automation system, was making a splash by giving away de-



signer telephones to anyone who would sit through their 15-minute presentation.

"An excellent way to get the attention of the marketplace," commented one attendee clutching his telephone.

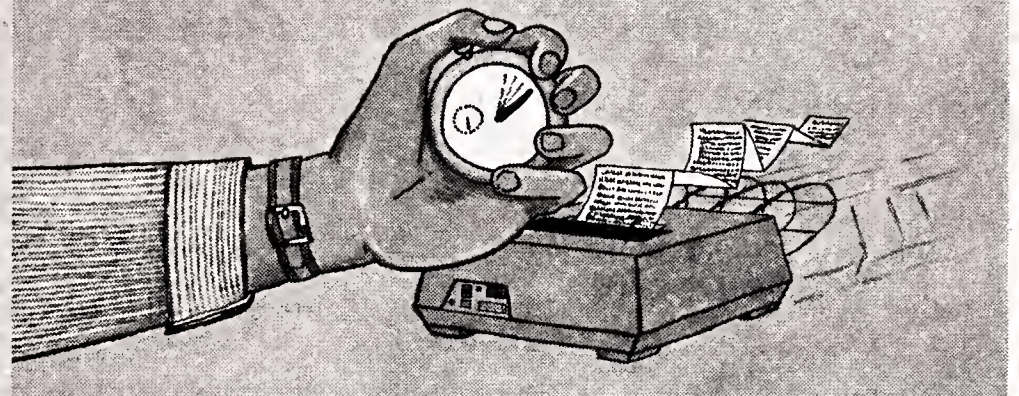
■ Then there was Jack Chang, president of Dallas-based Quadstar Corp., a legend in his own time in the electronic payments industry, it would seem. He is a co-patent holder on the first automated teller machine (ATM) and the magnetic strip-coded credit/debit card.

While standing at his company's booth, Chang steadily acknowledged the continual stream of well-wishers who also appeared extremely interested in the late 1984 sale of his eight-year-old company to Citibank, the banking subsidiary of Citicorp.

Citibank strikes fear in the heart of regional bankers, who dread the day interstate banking could become a reality and who might face Citibank's deep pockets.

According to Chang, Quadstar is the only Citibank subsidiary that can sell hardware and software packages in a completely independent marketing mode. Quadstar developed and installed the nation's largest operating electronic funds transfer system for the Florida-based Publix Super Markets, Inc. chain, a system of 319 ATMs in 282 sites, to which is being added more than 3,000 point-of-sale terminals.

How To Triple The Speed Of Your 3270 Printer



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NEWS

Micros move to banks' front lines as client service tools



CW AT NOAC

By Bryan Wilkins
CW Washington Bureau

DALLAS — The microcomputer is moving into the front office next to the loan officer at the bank.

It is moving from the bank's back-office DP center as rapidly as competition from other financial service providers is forcing changes in the traditional way of handling money.

That was the consensus at last week's annual National Operations and Automation Conference (Noac),

sponsored by the American Bankers Association for bank DP managers. In his keynote address, Joseph J. Pinola, chairman of the board of First Interstate Bancorp in Los Angeles, said, "The competitive strains on the banking industry are the most intensive ever."

Aided by micros, banks are developing new services such as daily reporting of corporate cash balances as users demand more sophisticated services.

According to John McAllister, executive vice-president of Broadway & Seymour, a Charlotte, N.C., developer of branch automation software for IBM's 4700 series financial products, bank technology is demanding a

new type of performance. One such application, he said, is placing a smart on-line terminal on the desk of the bank officer to access a client's account record, look at the bank's current cash exposure or determine the daytime overdraft.

"We see a 39% annual growth rate for bank technology through 1990," McAllister said.

In the past, micros in banking were usually acquired on an ad hoc basis, said Joseph C. Cauley, manager of the end-user consulting group at Citizens & Southern National Bank in Atlanta. This was followed by management efforts to control their proliferation.

Now that microcomputers are be-

ing accepted in banking, Cauley said, they are being used in the development of new client services and products and to aid a bank's productivity, even though critical strategic bank decisions on the architecture of micro-mainframe links are not yet in place.

Micros, for example, are being linked in vendor-supplied local-area networks and connected to mainframe data bases, paralleling the evolution of data base management systems and the office automation sector, Cauley said.

However, according to Cauley, microcomputer users in banks tend to be demanding. Initially happy with off-the-shelf packages such as Lotus Development Corp.'s 1-2-3, they are now demanding access to raw mainframe data.

Cauley reported that simple downloading from the mainframe to the micro is not easy in the bank environment despite the existence of software packages designed for the task.

In one instance, "Our fixed asset people wanted to download selected information from fixed asset and

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Micro users in banks are now demanding access to raw mainframe data.

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general ledger. They thought by loading information into [the Lotus software] they could automate the balancing and would save lots of time. We had to write specific applications code to extract the information from the mainframe file," Cauley recalled in a conference session on managing micros.

"Micros are being used in distributed processing solutions because they are very modular. They can be set up to emulate a dumb terminal and they can also function as an on-line transaction processor," noted Bryan Girard, president of San Francisco-based Bankpro, which markets an IBM Personal Computer-based electronic funds transfer system called Wirenet.

Girard sees the micro being used to off-load job functions from larger systems, such as the IBM System/36, which can then become dedicated to another task, such as functioning as a server for micro cluster configurations.

The IBM Personal Computer and Personal Computer AT will allow smaller banks that make 600 to 1,200 EFTs a day to cost-justify connection to the Federal Reserve System's Fedwire and other payment systems.

In the estimation of Jerry M. Cox, senior management consultant for Charles Brooks Associates of Charlotte, N.C., the proliferation of the micro has been good and bad for banking.

Although the development of user-friendly micro software has helped give banks a competitive edge and provide up-to-the-minute cash management services to valuable clients, the packages are still too reliant on technology, he said.

NEWS

Strong micro control yields results for bank DP shops



CW AT NOAC

By Bryan Wilkins
CW Washington Bureau

DALLAS — Strong, centralized management control over microcomputers is winning converts in the banking industry as performance and productivity rise, according to bank DP managers who have fought the micro control battle.

Speaking at the annual National Operations and Automation Conference (Noac) here last week, Thomas E. Wilson, manager of information services at United Banks Service Co. in Englewood, Colo., said the critical issue for its parent company, United Banks of Colorado, Inc., when it installed micros was to ensure that the micros emulated existing mainframe computer functions.

"We had to ensure that we had a micro product that complemented our existing mainframe because we didn't want a proliferation of unrelated micro applications popping up all over the place," Wilson said.

The service company set up what it called a primary information processing system to centralize all processing for the \$4 billion bank holding company. That system had to include processing from five individual banks, he explained.

Wilson said the next step was to follow a strategy for what jobs the micros would perform in order to define the structure in which they existed. "Budget and profit planning for the various services and products the bank wanted to offer was an obvious area," he noted.

With the bank's mainframe software running in an IBM Systems Network Architecture/Synchronous Data Link Control environment on IBM 3033 and 3080 mainframes, the micro-mainframe link initially depended on the IBM 3278 terminal system. An existing SAS Institute, Inc. data base management system package, as well as a file transfer program from SAS, was intended to be transferred to an IBM Personal Computer XT and AT environment, which would then run commercial off-the-shelf applications, such as Lotus Development Corp.'s 1-2-3 for DBMS and Multimate International Corp.'s

Multimate for word processing, and some in-house-generated applications.

According to Wilson, when the micros began running in their mainframe mode, the mainframe appeared to function as a powerful dedicated hard-disk support system that contained 256M bytes of memory, making it an "extremely important resource."

The micros could access the bank customers' account data by bank service category and perform profit and loss analyses of bank data by service category on a monthly basis in a fraction of the time that it had previously taken.

Manipulating data for later

uploading to the mainframe was a subject about which many bank MIS directors used to groan because of security and data integrity concerns. This was no longer an issue, however, because the micros were doing jobs the mainframe formerly did, Wilson explained.

Summarizing the bank's experience, he asserted that starting out with a good mainframe product is important to keeping data integrity from becoming an issue.

United Banks personnel are now calculating asset/liability ratios in 10 minutes with micro applications, Wilson said, while bank chief executive officers can project their bank-year figures in 20 minutes.

Labor groups sponsor VDT study

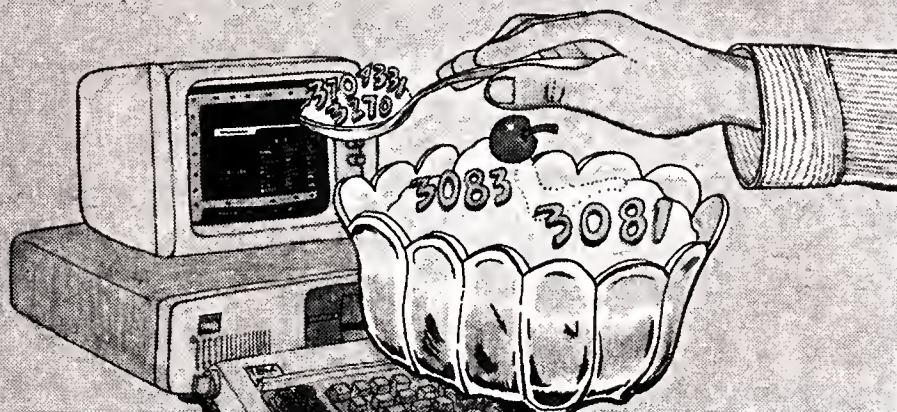
NEW YORK — Long outspoken in their views about pregnancy hazards associated with VDT use, two labor groups have commissioned a New York-based scientist to conduct a four-year study on the subject.

The Service Employees International Union and 9 to 5, the National Association of Working Women, announced last week that Dr. Irving Selikoff, professor at the Mount Sinai

School of Medicine at the City University of New York, will study work patterns and reproductive histories of more than 10,000 working men and women. Both organizations will recruit study volunteers; a spokesman said.

The study will be funded in part by the March of Dimes. Selikoff's laboratory is supported by the American Cancer Society.

How To Delight Your Lotus With Mainframe Data



Another Smart Solution From AVATAR

The idea is simple. Make your PC spreadsheet even more powerful by giving it mainframe data. But getting that data out of your mainframe, into your PC and onto your spreadsheet isn't that simple.

Until now, you've had three choices. Transfer entire files from the host and risk choking your PC with data. Not very efficient. Or find the information in printed reports, then reenter and reformat it. Very tedious. And the alternative of asking your DP department to write special host software... well, they're overburdened already. Three choices, no real solution.

Now there's TURBO, the newest micro-to-mainframe link from AVATAR.

TURBO's Data Capture lets you select just the information you need from the mainframe. And use it immediately in any of your PC applications—Lotus, dBASE, you name it. Without rekeying, reformatting, reanything.

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NEWS

Banking crises bringing push for tighter EFT controls



CW AT NOAC

By Bryan Wilkins
CW Washington Bureau

DALLAS — The recent banking crises in Ohio and Maryland, where problems in individual bank loan portfolios fostered 1930s-style bank runs, are prompting new measures to tighten bank management practices, according to the director of data processing for the New York Automated Clearing House Association (Nacha).

Nacha, the country's largest private electronic funds transfer (EFT) network, processes 95,000 payments, worth approximately \$300 billion, daily, explained William Walsh, its DP director. This volume compares equally to the Federal Reserve Board's total daily EFT transfers for the entire U.S.

"The financial problems we have experienced recently in various states have prompted a greater awareness by banks of the processes we use to manage cash," said Walsh, who was attending the American Bankers Association National Operations and Automation Conference

BMC Software abandons suit against IBM

ARMONK, N.Y. — BMC Software, Inc. of Stafford, Texas, last week dropped its 11-month-old antitrust suit against IBM.

The suit, filed last August in U.S. District Court in San Jose, Calif., claimed that IBM had been illegally requiring its customers to purchase an IBM disk-logging program when they bought IBM's IMS data base management system, according to IBM spokeswoman Pamela Hawkins.

BMC Software received no money or other concessions from IBM in return for dropping the suit, Hawkins said.

BMC Software could not be reached for comment at press time.

Hawkins, however, claimed that BMC Software's suit had been crippled in December when Judge William A. Ingram ruled that there was no basis for BMC Software's claim of illegal tie-in sales.

A secondary BMC Software claim that IBM had a lease-only policy for IMS 1.3, the software's latest release, remained to be ruled upon by the court prior to BMC Software's cessation of the suit.

Responding to that claim, Hawkins said "IBM doesn't lease [IMS 1.3], it licenses it." She maintained that BMC Software's dismissal of the suit was not the result of a settlement with IBM and said that the dismissal means that "BMC is prohibited from reinstituting legal action" in the case.

During the 1970s, IBM was sued by competitors alleging antitrust law violations on at least nine occasions. Of those cases that went to trial, IBM won all of them.

"

"The financial problems . . . in various states have prompted a greater awareness by banks of the processes we use to manage cash."

— William Walsh
New York Automated Clearing House Association

(Noac) last week.

Walsh, however, distinguished between the degree of expertise that exists in a bank's oversight of its own customers' net cash positions and the less certain ability to monitor the cash exposures that rapidly change between banks themselves.

"We don't have many software applications that address a bank's exposure, and we see that the Fed is having to address this problem," he added.

Nacha recently inaugurated its own internally developed software program to monitor the bilateral cash

relationships between banks in response to this perceived problem, Walsh said.

Essentially, the program establishes limits on the amount of a bank's exposure to another bank, with the information on the bank's net cash position at any given time stored within the Nacha system.

As many as 138 "world class" banks are currently connected to the Nacha system and are also connected into the Federal Reserve System's Fedwire. The banks must comply with the Fed's regulations on daylight overdraft limits between banks that measure the amount of net credits and debits that exist at any one time for a bank.

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NEWS

Tandem E-mail tools let dissimilar systems swap data

By Jeffrey Beeler
CW West Coast Bureau

CUPERTINO, Calif. — Tandem Computers, Inc. today entered a new phase in its long-range product strategy by introducing five electronic mail utilities that reportedly use existing Tandem networks to exchange information among incompatible business machines.

The Tandem communications software utilities are as follows:

■ PS Mail, which reportedly allows users of selected models of dissimilar terminals or microcomputers to exchange documents electronically over a Tandem communications network.

■ PS Text Edit, which permits

those documents to be written and then edited prior to transmission or following receipt.

■ PS Text Format, which aids users in designing and formatting their electronic transmissions.

■ Faxlink, which enables images to be sent over a Tandem network, stored in a mainframe, retrieved and then printed out at any CCITT Group III facsimile machine.

■ PC Link, which reportedly allows IBM or compatible micros to emulate 3270 or Tandem 6530 terminals and then exchange files with mainframes. A typical application might involve a large retail store chain that needs to download daily price changes from its central office to mi-

cro in the field, according to Jeri Edwards, a Tandem product manager.

The operation of each of the five mainframe-resident or diskette-based software modules depends on Tandem's Transfer, which reportedly moves information, regardless of its source or format, among individuals or applications.

Since Transfer's introduction in 1982, many of its information delivery capabilities have remained largely unused, according to Kathryn Weiner, a Tandem product management director. But the addition of the five information management tools finally permits those capabilities to be tapped, she said.

Tandem's move on the communica-

tions front broadens the selection of business machines that can exchange information over the company's network. In the past, the vendor's own 6530 and Dynamite workstations were the only desktop devices that could send and receive information through Transfer.

With the electronic mail programs, Tandem has expanded the range of Transfer-supported workstations to include TTY-class terminals, 3270s and IBM or compatible personal computers. The products also allow information to be moved over Tandem networks in a variety of forms. Used together, the packages reportedly enable the company's users, for the first time, to send, store and retrieve images either alone or combined with electronic text.

The additions to Tandem's product line mark the debut of the company's Information Management Technology (IMT) strategy, a long-term plan for interconnecting incompatible machines and networks through the firm's existing communications facilities. Ultimately, IMT aims to ensure that Tandem's own networks form the communications backbone for Fortune 1,000 companies, its major target customers, Weiner said.

Scheduled for shipment during the third quarter, the five Tandem electronic mail programs are available for initial license fees ranging from \$495 to \$12,500, with additional monthly charges ranging from \$50 to \$200.

Tandem is headquartered at 19333 Vallco Pkwy., Cupertino, Calif. 95014.

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ICCP outlines recertification

DES PLAINES, Ill. — The Institute for Certification of Computer Professionals (ICCP) has announced guidelines for recertification in its Certified Systems Professional (CSP), Certificate in Data Processing (CDP) and Certificate in Computer Programming (CCP) offerings.

A three-year recertification cycle for the CSP program will begin Jan. 1, 1986, a spokesman said. The program requires 120 contact hours of continuing education during each three-year period following the original attainment of the certificate. Educational activities preapproved by ICCP will be credited toward the recertification.

Current CSPs and those qualifying under the Professional Experience Provision, which ended May 31, may earn credits for approved educational activities as of Jan. 1, 1985, provided that validated documentation is submitted, the spokesman said.

The recertification cycle (120 hours of credit in a three-year period) for applicants taking the CDP and CCP exams will begin with the May 1986 applicants, the ICCP said. CDP and CCP holders who received their certificates before 1986 will not have mandatory recertification requirements, the spokesman said.

More information is available from ICCP, 2200 E. Devon Ave., Des Plaines, Ill. 60018.

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NEWS

Vendor maintenance strong, despite third-party surge

By Jeffry Beeler
CW West Coast Bureau

Fox-Stanley Photo Products, Inc. relies exclusively on a third-party maintenance firm to service the IBM Personal Computers in the 153 photo finishing labs the user operates in 22 states.

For the rest of its in-house hardware, however, the San Antonio-based vendor of photographic supplies and photo finishing services obtains its maintenance directly from the equipment's manufacturers. "We use [NCR Corp.] personnel to service our [NCR Criterion 8575] mainframe and [Data General Corp.] people to maintain our Data General machines," according to Vincent Howard, MIS vice-president for Fox-Stanley.

In its division of maintenance work load between third parties and manufacturers, Fox-Stanley typifies medium and large corporations throughout the U.S. Although the independent service market is expanding rapidly and has suddenly emerged as a subject of intense industry interest, big-name manufacturers still hold a near-monopoly in large-scale CPU maintenance.

But at the opposite end of the processor spectrum, events have unfolded quite differently, according to D. Roger MacNaughton, president of Business Development International, Inc., a Franklin Lakes, N.J.-based consulting company. Among users of personal computers and their peripherals, for example, independent service providers have already made significant inroads, even though micros have yet to progress much beyond their technological infancy.

Third parties are also doing brisk service busi-

ness with operators of large networks of automated teller machines and point-of-sale terminals.

Even among owners of products as large and comparatively expensive as minicomputers, small business systems and intermediate-scale processors, the independents have established a strong market presence. Bell Atlantic Corp.'s recently acquired Sorbus division, for example, owes roughly a third of its estimated \$160 million maintenance business to IBM systems ranging from System/34s to 4300s, according to Sorbus President Ron Wallace.



But at the upper reaches of the CPU performance scale — in a realm synonymous with IBM 3080-class machines — third parties are comparatively rare, except for small, local outfits and firms serving specialized market niches.

Why is independent hardware maintenance distributed so unevenly over the range of market possibilities? Why have most major third-party firms shunned some product classifications and gravitated toward others?

Part of the reason is that procurement responsibilities are increasingly being dispersed from computing professionals to nontechnical end users — two groups with often sharply divergent views about which service medium is best.

Until recently, hardware buying power rested squarely in the hands of MIS executives, who typically have long-standing relationships with particular mainframe vendors and thus are culturally predisposed to sign service contracts with manufacturers. But with the growing popularity of micros, procurement has become increasingly demo-

cratic, according to John Harnett, industry services director for TRW, Inc.'s Customer Service division.

"People other than just MIS professionals are now making the service procurement decisions, and they are not necessarily brought up in a data center mode of thinking," Harnett said. "These people are more willing to go with third-party maintenance because they don't have as much cultural baggage."

Varied servicing practices

Another reason that the independent maintenance market has proliferated so unevenly has to do with the manufacturers, whose service practices vary widely from one industry sector to the next. Some of the practices have proven a boon to the growth of third-party maintenance, while others have inhibited it.

At the large-scale mainframe end, for example, many of the major equipment vendors have erected imposing barriers that effectively bar independents from the MIS service business. With IBM, the chief impediment for would-be challengers appears to be financial. "The sheer cost of entering the IBM mainframe segment of the maintenance market is so great" that most third parties are discouraged from even trying, according to MacNaughton.

With the Bunch companies, the obstacles to third-party competition often manifest themselves differently. In an effort to repel potential poachers from their mainframe service turf, many of the Bunch vendors have become increasingly reluctant

See **COMPETE** page 17

Critical service factors* (by vendor)

	Burroughs Corp.	Data General Corp.	Digital Equipment Corp.	Hewlett-Packard Co.	Honeywell, Inc.	IBM	NCR Corp.	Prime Computer, Inc.	Sperry Corp.	Wang Laboratories, Inc.	Third-Party Vendors	Factor Average
Hardware repair	3.8	4.0	4.4	4.2	3.9	4.2	4.0	3.9	3.9	3.8	4.8	4.0
Software support	3.1	3.1	3.3	3.4	3.1	3.3	3.0	3.1	3.1	2.7	3.4	3.1
Rapid service response	3.8	3.5	3.8	3.6	3.6	3.6	3.5	3.4	3.7	3.3	4.2	3.6
Preventive maintenance program	3.2	3.8	4.0	3.6	3.5	3.1	3.1	3.4	3.2	3.3	3.5	3.4
Service of field engineer	3.7	4.0	4.1	3.7	3.8	3.7	4.0	3.7	3.8	3.5	3.8	3.8
Service of field service management	3.2	3.1	3.6	3.4	3.2	3.4	3.4	3.3	3.4	3.3	3.5	3.3
Service of system support	3.1	3.0	3.2	3.5	2.9	3.2	3.0	3.0	3.3	3.0	3.2	3.1
Service by support representative	3.1	3.1	3.1	3.5	3.0	3.3	2.9	3.0	3.2	2.9	2.9	3.0
Quality of service	3.8	3.9	4.2	4.1	3.6	3.7	3.7	3.7	3.6	3.8	4.5	3.8
Telephone diagnostic capability	3.0	3.1	3.6	3.3	3.2	3.0	3.0	3.3	3.2	3.3	3.3	3.2
Emergency repairs contract hours	3.8	3.7	3.9	3.7	3.9	3.8	3.6	3.6	3.8	3.5	4.4	3.8
Emergency repairs noncontract hours	3.0	3.6	3.6	3.3	3.6	3.3	3.4	3.2	3.5	3.0	3.7	3.4
Company average	3.4	3.5	3.7	3.6	3.5	3.5	3.4	3.4	3.5	3.3	3.8	

* On a rating scale of 1 to 5, with 5 as the highest

Source: International Data Corp.

CW CHARTS

Service performance* (by vendor)

	Burroughs Corp.	Data General Corp.	Digital Equipment Corp.	Hewlett-Packard Co.	Honeywell, Inc.	IBM	NCR Corp.	Prime Computer, Inc.	Sperry Corp.	Wang Laboratories, Inc.	Other Vendors	Third-Party Vendors	Item Average
Prompt arrival on site	3.6	3.5	3.8	3.5	3.5	3.5	3.4	3.5	3.7	3.3	4.1	3.6	3.6
Reaching right person at service office	3.6	3.6	3.8	3.6	3.6	3.6	3.6	3.3	3.7	3.3	3.9	3.7	3.6
Ability to get spare parts	3.5	3.2	3.7	3.6	3.2	3.7	3.1	3.1	3.3	3.2	3.9	3.7	3.4
Reliability of spare parts	3.9	3.6	4.1	4.4	3.6	4.2	3.7	3.8	3.7	3.5	4.1	4.0	3.9
Service representative repairs equipment without technical assistance	3.6	3.8	4.1	4.1	3.6	3.8	3.9	3.5	3.5	3.8	4.0	4.0	3.8
No need to replace parts	3.3	3.0	3.5	3.6	3.2	3.6	3.3	3.0	3.3	3.3	3.7	3.5	3.4
Time taken to return with parts	3.1	3.1	3.7	3.4	3.3	3.5	3.3	3.3	3.2	3.1	4.1	3.6	3.4
Company average	3.5	3.4	3.8	3.7	3.4	3.7	3.5	3.3	3.5	3.4	4.0	3.7	3.6

* On a rating scale of 1 to 5, with 5 as the highest

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60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining

Vendors

- 80 Manufacturer of Computers, Computer-related
Systems or Peripherals
85 Computer Service Bureau/Software/Planning/
Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor

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- 12 VP/Assistant VP
- 13 Treasurer/Controller/Financial Officer
- 21 Director/Manager/Supervisor DP/IMS Services
- 22 Director/Manager of Operations/Planning/
Administrative Services
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
- 35 OA/WP Director/Manager/Supervisor
- 38 Data Comm Network/Systems Mgmt
- 41 Eng./Scientific/R&D/Tech Mgmt
- 51 Mfg Sales Reps/Sales/Marketing Mgmt
- 60 Consulting Mgmt
- 70 Medical/Legal/Accounting Mgmt
- 80 Educator/Journalist/Librarian/Student
- 90 Other

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NEWS

SERVICE from page 1

agers to rate the relative effectiveness of independent and manufacturer service.

On the subject of how the two sides compare in response time, 80% of the MIS managers rated third-party providers as good as or better than their manufacturer counterparts, MacNaughton said. Independent companies also scored impressively in critical service factors like repair time, skill of maintenance technicians and price.



Nearly all the respondents, for example, credited third-party providers with being equivalent to or lower than the vendors in pricing,

while 70% of the users found the independents as fast as or faster than the manufacturers in repair time. Three-fourths of the MIS managers believed the relative skill of the independents' technicians equaled or surpassed that of the vendor technicians, MacNaughton said.

The high esteem in which customers increasingly hold independent service firms has apparently resulted more from the field's own efforts at self-improvement than from any marked deterioration in service quality among the major manufacturers.

Among the most conspicuous of the third-party firms' recent advances has been their widespread success in improving the tenure and professional maturity of both their management staffs and service forces.

"Ten or 15 years ago, if you compared a manufacturer to a third party, you found an experienced guy on one side and a novice on the other," explained John Harnett, industry services director for TRW, Inc.'s Customer Service Division. "Today, many of the third-party companies employ a lot of managers and technicians who have 10 or more years of industry experience, which increases the expertise that can be brought to bear on maintenance problems."

With expanded resources have

COMPETE from page 16

to supply independent maintenance companies with needed spare parts, MacNaughton said.

Low-end market hospitable

At the low end of the product spectrum, by contrast, third parties have found market conditions comparatively hospitable. Because of severe profit pressures within their manufacturing operations, most microcomputer equipment makers lack the financial wherewithal to build their own national service organizations.

In leaving users to fend for themselves, the vendors, in effect, have abandoned one of the maintenance field's fastest growing sectors to a host of third parties, which have pounced on the opportunity with relish.

Moreover, until just a year or so ago, most major hardware makers steadfastly refused to maintain other manufacturers' equipment, even if their own gear and the foreign products formed part of the same mixed-vendor system. That policy, too, led to a lucrative market opening that has contributed heavily to the independent service business' new-found prosperity.

”

'As long as the manufacturers continue to do a good job of servicing their products, customers will be reluctant to stray.'

— Rawlin Fairbaugh
Association of Field Service Managers

come heightened industry awareness of the third-party sector's existence and an increased willingness by users to consider alternative sources of hardware repair, he added.

However, the independent maintenance field's growing legitimacy does not portend a mass defection of customers from the manufacturers' national service organizations, noted Rawlin Fairbaugh, acting president of the Fort Meyers, Fla.-based Asso-

ciation of Field Service Managers.

"Most users are extremely loyal to the vendors [that] sell them their equipment," he said. "As long as the manufacturers continue to do a good job of servicing their products, customers will be reluctant to stray."

Manufacturers hold some potent trump cards for perpetuating their existing service business and keeping hungry third-party providers at bay. One such card is the strong desire

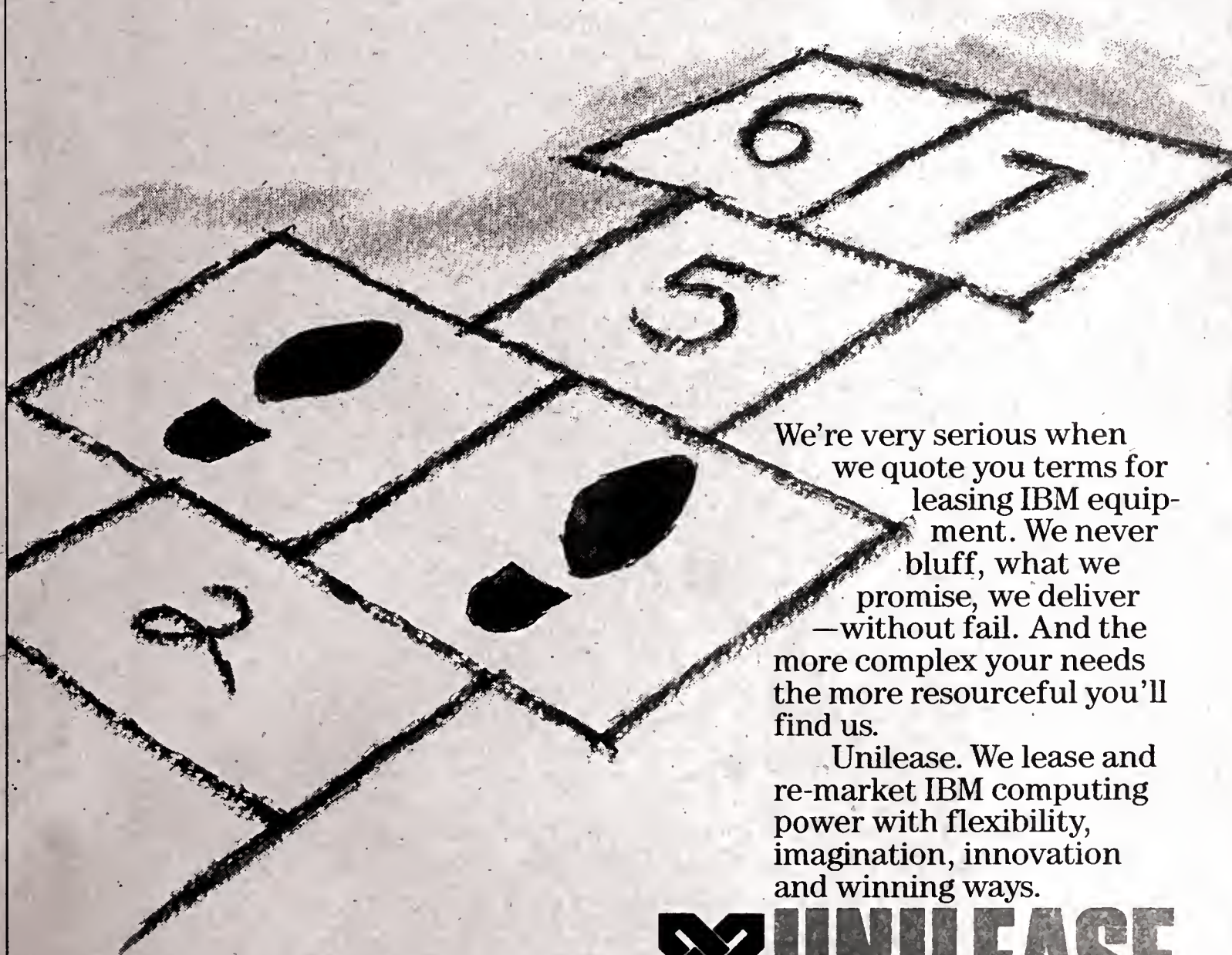
among most users to ensure some form of vendor accountability.

"Knowing that a piece of equipment is made and serviced by the same firm gives you that warm, fuzzy feeling that allows you to sleep at night," according to Vincent Howard, MIS chief at Fox-Stanley Photo Products, Inc. of San Antonio.

Another inherent strength of manufacturer service organizations is that they enjoy ready access to critical spare parts — a claim that third-party providers are sometimes hard-pressed to match, Howard said.

But the independent maintenance companies also wield some effective trump cards of their own. For one, they offer a single-source solution to hardware maintenance problems and thus immunize multivendor installations from potentially destructive finger pointing, Fairbaugh said.

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NEWS

Independent maintenance market: Small fish, big pond

By Jeffrey Beeler
CW West Coast Bureau

Hardware manufacturers are scrambling to enter it. Customers are increasingly evaluating it. And market pundits are tirelessly analyzing it.

But amid the growing activity, one salient fact about the third-party service field has been consistently downplayed: Independent maintenance remains a fairly paltry market.

The hoopla that has recently descended upon the third-party maintenance sector is all out of proportion to its current sales potential, according to D. Roger MacNaughton, presi-

dent of Business Development International, Inc.

Even by the most optimistic estimates, the combined revenues of all the third-party maintenance business' current players total about \$1.2 billion.



Although about 300 vendors now crowd the third-party marketplace, even the largest of these are small by computer industry standards.

Xerox Corp., for example, only recently joined the growing parade of third-party maintenance providers. With an annual service business calculated at \$18 million, however, the firm ranks 10th in revenue among the industry's many par-

ticipants, MacNaughton said.

For the others of the top 10 independent service suppliers, the same principle applies: Each is owned by a giant parent company whose total revenue dwarfs the financial contributions of its maintenance subsidiary.

Although the field is thought to be expanding at 15% per year, its climate is becoming increasingly competitive, MacNaughton said. One reason for the mounting difficulty is that hardware reliability has improved dramatically and thus has significantly trimmed the number of opportunities for revenue-generating service calls.

Another reason is that during the

past year the third-party maintenance arena has turned into a magnet for a growing number of formidable competitors.

Prominent among the stream of recent arrivals are several big-name hardware manufacturers that had hitherto minded their own service business and had left the rest of the maintenance market alone. Early this year, for example, Digital Equipment Corp. disclosed its intention to begin servicing foreign peripherals that are attached to its own processors.

Honeywell, Inc. has also entered the third-party maintenance market, first by signing a service agreement with Apple Computer, Inc. and then by announcing — on May 31 — a similar arrangement with Convergent Technologies, Inc.

Market shaken to its core

IBM recently got into the independent service act when it revealed a plan to maintain competitive gear operating in concert with Big Blue's micros. But the recent market event that shook the third-party maintenance business to its core was the complex transaction that paved the way for Bell Atlantic Corp.'s acquisition of Sorbus, Inc.

Partly because it involved large dollar amounts, the deal created a national sensation and immediately turned independent service into an industry fad, MacNaughton said.

How the third-party maintenance business will ultimately react to the steady influx of major hardware manufacturers remains to be seen. "The market is probably growing fast enough to support almost everyone," according to Sorbus President Ron Wallace. "The guys with the big bucks and big organizations will capture their share of business, and the real little guys that operate in one city will continue to do well, too. But the middle-size companies are in danger of getting squeezed out."

AMA plans information systems meet

NEW YORK — The American Management Associations (AMA) here has announced that its "Long-Range Information Systems Planning" seminar will be held June 17-19 in Boston.

The seminar will address techniques for determining priorities of management and users, linking data processing strategies to corporate needs, demonstrating cost effectiveness, evaluating hardware and software, setting measurable objectives, adopting procedures that provide for optimum use of data and refining plans to meet changing needs.

The course leader is Michael Albrecht Jr., president of M. Albrecht Jr. & Associates, Inc., a Michigan-based management consulting firm.

Course registration fees are \$775 for AMA members and \$890 for non-members.

More information is available from the AMA at 135 W. 50th St., New York, N.Y. 10020.

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Employer: N/A
Work phone: N/A

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Number of Dependents: 0

Location: Bldg A
Work Phone: 4938
Marital Status: S
Social Security Number: 242-23-3443

Home address: Apartment D
4905 Dana Drive
San Jose
CA 95126
Home phone: 555-7634

Information about Employee's Spouse:
Spouse's Name: N/A
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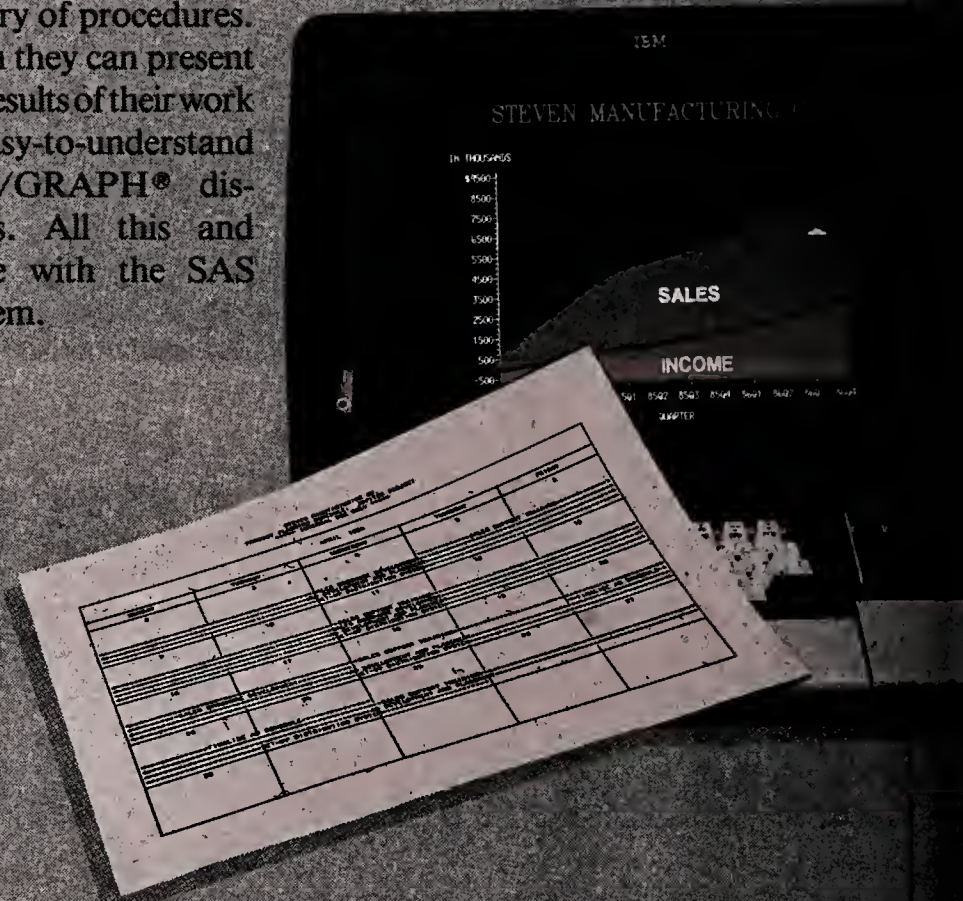
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Administrative Costs	500,000	550,000	600,000	650,000
Marketing Costs	300,000	350,000	400,000	450,000
Research & Development	200,000	250,000	300,000	350,000
Capital Expenditures	100,000	150,000	200,000	250,000
Depreciation	150,000	150,000	150,000	150,000
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	JACCT120	7	36.97	5.27	14968	4995
	JACCT220	6	103.95	12.99	74237	9280
	OTHERS	25	113.76	4.55	56085	2643
HUMAN RESOURCES	OTHERS	16	31.00	1.72	50314	2795
LEGAL	OTHERS	16	17.00	1.06	6218	514
MARKETING	JMKT0110	3	31.35	10.45	13557	4519
	JMKT0200	9	145.36	16.15	159131	17681
	JMKT0215	8	82.33	10.29	43748	5469
	JMKT0220	7	67.01	9.57	132357	16908
	OTHERS	21	89.95	4.28	100880	4804
PLANNING	OTHERS	17	43.00	2.53	27479	1616
PRODUCTION	JPROD000	12	80.47	6.71	107271	8939
	JPROD050	7	170.00	24.29	89020	12717
	JPROD050	4	58.35	14.59	91561	22890
	OTHERS	24	142.18	5.92	108332	4515
SYSTEMS	JSYS025	4	36.47	9.62	22519	5630
	JSYS020	4	24.62	6.15	39212	9003
	JSYS010	4	47.36	11.84	41740	10435
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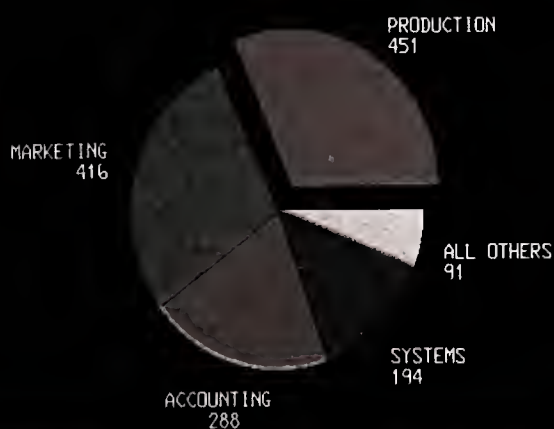
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NEWS

FCC modifies equal access arrangement

WASHINGTON, D.C. — The Federal Communications Commission modified its equal access implementation May 31 and immediately ordered all customers to choose by ballot their long-distance carrier. Customers who do not choose will be allocated to a carrier based on a percentage formula of those voting.

The action came in response to complaints by MCI Communications Corp. that the automatic assignment of default customer traffic to AT&T Communications under existing rules was not a fair practice to encourage development of a competitive marketplace [CW, June 3]. The FCC called the previous arrangement "unreasonable and discriminatory" and said AT&T had enjoyed a "distinct advantage."

MCI reportedly was pleased with the FCC action, which takes effect immediately.

Approximately 10% of the local exchanges in the country have been converted to equal access, making it possible for phone customers to avoid dialing extra digits if

they select a carrier other than AT&T. The implementation of equal access was ordered as part of the AT&T breakup.

The FCC action came after statistics showed that between 30% and 70% of customers were not making a choice of a carrier when an exchange was converted to equal access.

The new rules will require the local telephone company to send ballots to customers 90 days prior to an equal access cut-over. A second ballot would be sent if no reply was received 45 days before cut over. The last chance for a customer to presubscribe would be 30 days before cut-over.

The FCC said the local telephone company could not allocate any defaulted customer to a carrier until 45 days before the cut-over at the earliest or 90 days after the cut-over at the latest. A customer would have six months after the cut-over to make a free selection change in their long-distance carrier.

Coalition forms VDT info center

WASHINGTON, D.C. — A coalition of VDT manufacturers and businesses that use VDTs recently announced the formation of the Center for Office Technology, which will provide information and educational programs about VDTs, office automation and ergonomics.

Leonard M. Zippin, chairman of the center, said it replaces the Coalition for Workplace Technology, which was backed by the Computer and Business Equipment Manufacturers Association (Cbema) and which frequently lobbied in state legislatures against VDT regulations. Zippin said the new center is expected to have more credibility because it is supported by businesses that use VDTs and by VDT manufacturers.

He said the center will have a broader mandate than the former coalition and will not undertake any legislative lobbying itself. Instead, Zippin said, the center will provide generic educational materials and studies to in-state coalitions that lobby on VDT issues.

To act as national clearinghouse

The center will act as a national clearinghouse for information on scientific studies on office automation, handle news media inquiries and provide workshops for private and government employers nationwide, Zippin said.

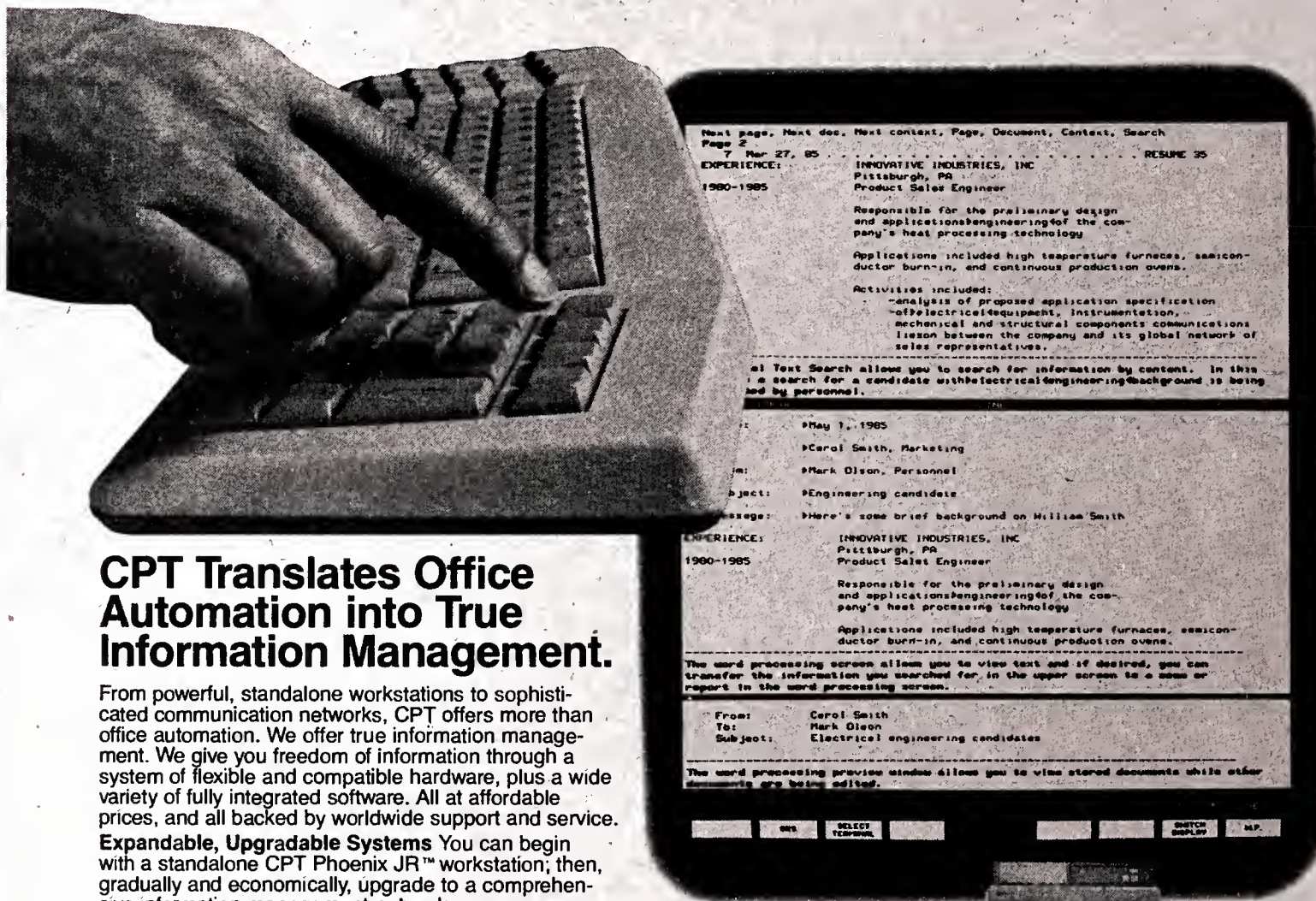
"Many private and public sector managers have planned and implemented excellent programs for introducing and using computer systems. Our goal is to build upon this knowledge and make it available to others," he said.

Zippin is executive vice-president of the American Insurance Association, one of the business groups supporting the new center.

In addition to Cbema and the insurance association, other supporters include Aetna Life & Casualty Co., the Air Transport Association, the American Council of Life Insurance, the American Electronics Association, the American Newspaper Publishers Association, AT&T, Cigna Corp., Digital Equipment Corp., Hewlett-Packard Co., IBM, St. Paul Fire & Marine Insurance Co., the Prudential Insurance Co. and Xerox Corp.

The center is located in Room 905, 1801 K St. N.W., Washington, D.C. 20006.

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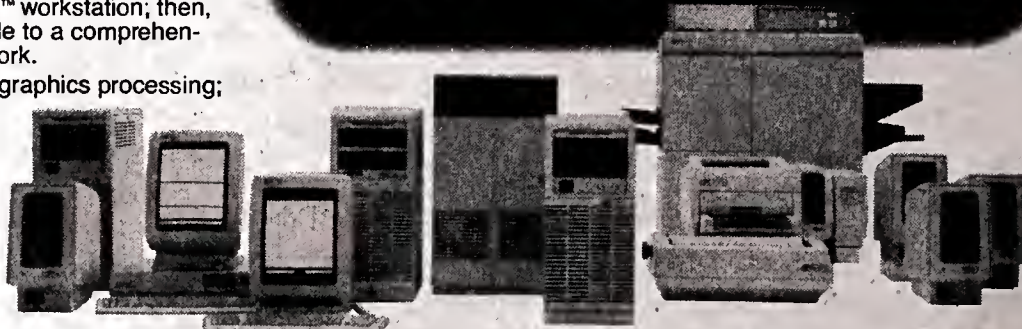
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NEWS

Target specific markets, software conference advised



CW AT
MIM '85

By Maura McEnaney
CW Staff

MONTREAL — The software industry has a hard lesson to learn from earlier fast-growth industries, namely the importance of market share.

David Fairbairn, director of the National Computing Center in Manchester, England, told attendees at the Montreal International Software Market, Inc. (MIM) '85 that in order to withstand the pressures of a mass

market, software companies must carefully categorize and understand their markets. The conference, titled "Software Marketing in the Global Village," was the first conducted by MIM, a private company jointly supported by the provincial government of Quebec and the Canadian national government.

In his speech, Fairbairn said today's software market is characterized by segmentation, massive sales volume and a need for product "robustness."

Custom software for mainframe applications remains the largest part of the software market, according to Fairbairn. To be successful, tomorrow's applications must be user-ori-

ented and have a low development time, he said. "Software tool kits," or program generators that help companies develop such applications, will be a particularly important area over the next few years, according to Fairbairn. "System tools and program generators will be the most competitive areas" and will increase programmer productivity by four or five times, he said.

Massive production of software utilities and applications products will continue, but development costs will increase, Fairbairn said. Sales volumes, however, will offset those development costs, he said. "In 1980, products costing \$500 would cost as much to produce as those that cost

\$5,000." Tomorrow's products will cost "two or three times as much to develop and bring to market," he said.

Multisystem software such as AT&T Unix products will see more growth over the next few years, according to Fairbairn, who said Unix-based products will capture 20% of the UK market in five years, compared with 8% penetration today.

Cries for standardization and integration of capabilities will continue, he said.

According to Fairbairn, software training needs will diminish as more products incorporate better Help facilities and tutorial packages.

Like other fast-growth industries that once worked with limited operations in a mass market, the software industry will eventually come into its own through the creation of diverse marketing channels that emphasize vertical markets, Fairbairn said. "[The software industry] is following a pattern, but the difficult task is finding out where we stand in that process," he said.

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End-user DP focus of meet

BOSTON — The Society for Information Management (SIM) will present its annual conference — this year titled "Managing the Explosion: End-User Computing and Emerging Technologies" — Sept. 8-12 at the Marriott Long Wharf Hotel here.

The conference will feature workshops on understanding the value, management and use of technology for managing the explosive growth of end-user computing. Registration fees are as follows: conference and workshop, \$1,175 for SIM members; \$600 for SIM faculty members; and \$1,295 for nonmembers; conference only, \$895 for SIM members; \$450 for SIM faculty members; and \$995 for nonmembers; workshop only, \$350 for SIM members; \$250 for SIM faculty members; and \$395 for nonmembers.

More information can be obtained from SIM Annual Conference, c/o Kimberly Gandia, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Pick software directory out

SAN DIEGO — The International Data Base Management Association (IDBMA) has released the fourth edition of its Application Software Directory for the Pick Systems Pick operating system.

The directory details 620 applications software packages that run on the Pick operating system and lists 58 consultants who specialize in the Pick operating system.

The IDBMA Application Software Directory costs \$30 plus \$3.50 for shipping and handling. It is available from the IDBMA, 9740 Appaloosa Road, San Diego, Calif. 92131.

NEWS

Exxon sees site licensing pact slicing software costs

By Edward Warner
CW Staff

HOUSTON — Exxon Corp.'s Exploration Division recently signed a site licensing agreement for personal computer software with Command Technology Corp. (CTC) that will reportedly save the oil company \$13,600 in its first year. The agreement is a first both for CTC and Exxon.

The license, for CTC's SPF/PC programming utility, will permit the division to distribute an unlimited number of copies of the package — including copies for home

shipping business [and] allows us to work on code development," CTC President Barry Patton said.

Site license growth seen

Exxon was about the 15th corporate user to approach Patton's Oakland, Calif.-based software firm about a site license, the CTC president said. He added that, al-

though CTC will still sell single copies, it expects its site license sales to grow.

Exxon's three-page contract with CTC, which was signed May 31, will save the Exploration Division about \$13,600 in its first year, Beddingfield predicted.

That estimate, he said, was arrived at by multiplying the 80 copies of SPF/PC

that have so far been requested by users by \$245, the package's single-copy price, plus a \$50 current-user upgrade charge. The software, he said, has been enhanced an average of twice a year.

The SPF/PC package will come into use this month in a pilot test with users, Beddingfield explained. Host-based ISPF screens, including

the needed batch commands, will be written to make downloads "as user-friendly or idiot-proof as possible," he added.

Though the agreement was a first for Exxon, a company spokesman said the firm is currently exploring the possibility of gaining personal computer site licenses from other vendors.

”

The license agreement is unique in that for one price — \$6,000 annually — it permits the Exploration Division to run the package on all the CPUs at Exxon's data center.

use — to users of the division's approximately 125 IBM 3270 Personal Computers.

Personal Computer users in Exxon Exploration's five subdivisions will also have a crack at the software, provided they have a valid business reason to use it, according to Michael Beddingfield, the division's supervisor of operating systems.

The software, for off-line programming of IBM's ISPF screen builder, will be downloaded to users from an IBM 3081 Model K mainframe, one of two at the division's DP center here.

The license agreement is unique in that for one price — \$6,000 annually — it permits the division to run the package on all the CPUs at its data center, Beddingfield said. Mainframe site licenses usually are sold on a per-CPU basis.

A site license for personal computer software can permit the making of unlimited copies of a program, which would otherwise violate the software's copyright.

Seeking to avoid copyright problems, corporate personal computer managers, through groups like the Microcomputer Managers Association, have been demanding that software vendors create site licenses.

Without a site license, Beddingfield claimed, it becomes "unmanageable for a large corporation to manage the personal computer [software] usage."

For CTC, the use of site licensing "gets us out of the

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The image features a dark silhouette of a person standing with their arms slightly away from their body. The background is filled with a dense, repeating pattern of the sentence "I WANT A [various application names] NOW." in a light gray, sans-serif font. The applications listed include 3-D drawing, fixed assets, telephone charge-back, consolidation, structural performance, property management, linear programming, numerical difference analyzer, human resource management, portfolio management, project, data modeling, payroll processing, water distribution, fluid dynamics, finite element analysis, contour plotting, warehouse management, office management, forms processing, PC communication, fleet management, flux monitoring, outage reporting, dry control, logistics entry, super star trek, safe deposit, cross-compiler, keyword retrieval, polynomial fitting, remote file transfer, transaction processing, job costing, order analysis, structural engineering, calendar management, material requirements planning, bill of materials, subscription fulfillment, critical path method, and correspondent. The repetition of the text creates a textured, almost hypnotic effect behind the central figure.

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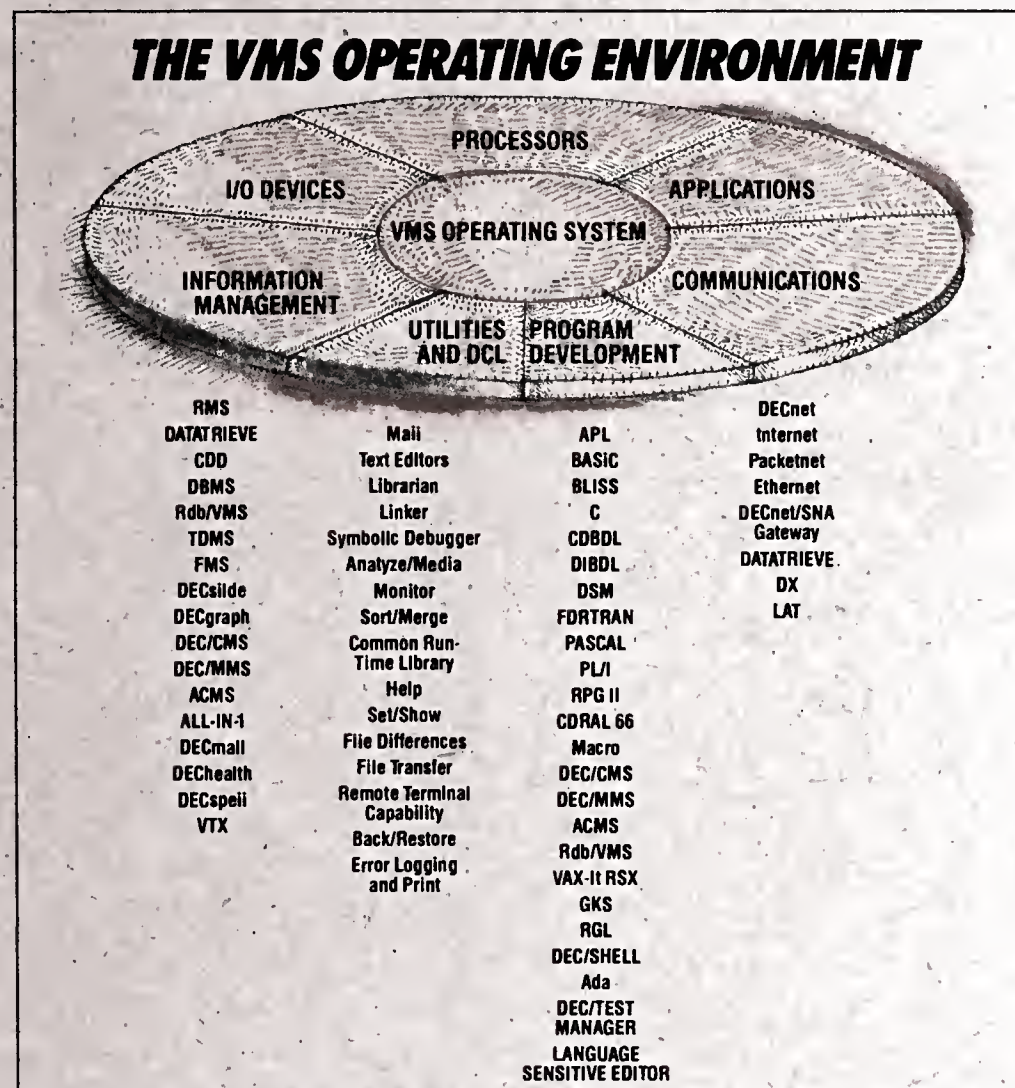
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NEWS

New Hampshire leaders wrestle with data access issue

By Donna Raimondi
CW Staff

CONCORD, N.H. — The branches of government in New Hampshire have reached an uneasy compromise as to who should and should not have access to computerized financial information.

The state will have completed the installation of an integrated financial system by July 1, said Norman VanderNoot, director of communications for Gov. John Sununu's office. When that system is installed, Sununu wants veto power over who has access to its data base, he said.

To a bill addressing issues related to the new system, Rep. V. Michael Hutchings (R-Plymouth) amended a request to reflect what he said are the access rights and privileges legislators already have on paper and should have electronically.

The bill passed in the legislature, but the senate amended it so that the governor would have veto power. This was done after the governor

made it clear he did not favor legislative access, said Wayne King (D-Rumney).

The legislature and senate then worked out a compromise that will allow legislative access only through an employee of the legislature — the budget assistant, he added.

King is working on developing guidelines to allow New Hampshire citizens, as well as legislators, to have access to all parts of the data base that are not confidential, he said. He is also trying to consolidate all state computerized information, such as the financial system, statistical information on aid to families with dependent children programs and game management programs so

that all the state's records will be together, making it easier to access needed information, he said.

"I don't see me winning that in the next round," King said. He said he hopes his efforts will lead to discussions and maybe to a pilot program, such as a few terminals set up in a state library for citizens to access information, he said.

The governor feels that legislators can get anything they want on paper or by phone, VanderNoot said, and should not have access to the data base. Information can be — and has been — misinterpreted in the state, he said, a problem that could increase if too many people have access to the records.

"This is not a partisan issue," Hutchings said, but a balance of power issue. The executive branch would have the upper hand if Sununu's wishes prevailed, he said. "Can we change from paper to computers and still keep the fine balance of power?" he asked.

"We're really talking [about] information as power here," King said. Information can be liberating if it is shared or enslaving if it is closely held by a few people, he said. He said he does not want to see the governor with veto power over who can access the data base. A governor with veto power over data base access could end up giving timely information only to "yes-men," he said.

IBM software strategies topic of forum

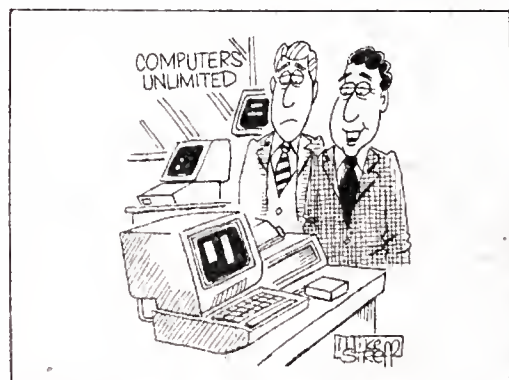
MONTEREY, Calif. — IBM's software strategies will go under the microscope when the Gartner Group, Inc. holds its second annual Software Forum, entitled "Software Strategies for the IBM World," at the Hyatt Regency Hotel here June 24-26.

The forum will investigate key trends in the software industry, and Gartner Group speakers and others will provide insights into IBM software strategies in such areas as operating systems, communications, applications and data base management systems. Among the speakers will be Scott Smith, vice-president, the Gartner Group; Fran Tarkenton, chairman of Tarkenton Software, Inc.; Gideon Gartner, president, the Gartner Group; and John Steuri, general manager of IBM's Information Services Group.

Topics of discussion are scheduled to include the following: "Can IBM recover lost ground in DBMS and applications software?"; "PC software — the next generation"; "Departmental computing — pipe dream or panacea?"; and "Programmer productivity — is help in sight?"

Conference fee is \$875.

More information is available from the Gartner Group, 72 Cummings Point Road, Stamford, Conn. 06902.



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NEWS



**INTERNATIONAL
REPORT**
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DENMARK

COPENHAGEN — Communications giant ITT will invest \$140 million in communications research and development efforts here, the company said. The investment is expected to create 1,000 jobs and generate increased export capital. Most of the companies receiving ITT funds are owned in part by ITT, including Standard Electric Kirk, producers of telecommunications equipment, private branch exchanges and electronic components; Christian Rovsing A/S,

manufacturer of data communications and turnkey systems; and RC Computer, a systems manufacturer.

JAPAN

TOKYO — Two automatic language translation packages have been announced here. Toshiba Ltd.'s Machine Translation System reportedly allows users to translate English to Japanese, arranging the meaning of the sentences according to grammar. The translation system features 3,000 basic words, translates at 5,000 words per hour and runs on the vendor's UX-700 under its version of AT&T's Unix.

NEC Corp. announced an English-to-Japanese/Japanese-to-English translation system called Pivot, which runs on NEC's Acos main-

frame series of processors. Pivot, which reportedly uses artificial intelligence to analyze sentences in the translation process, is expected to ship in December and will lease for \$2,000 per month.

TOKYO — Nippon Telephone and Telegraph (NTT) announced it will offer a voice-mail service within the next two years. The service will enable users to record their voice messages if calling a busy telephone line, and messages will be forwarded automatically when the line becomes free, a spokesman said. The service can also transmit messages to many receivers simultaneously and send messages at specific times and dates. The NTT system reportedly will also feature a news service. Now being tested, the system supports digital and push-button phones, NTT said.

NORWAY

TRONDHEIM — Norwegian users of Digital Equipment Corp. systems formed an autonomous arm of DEC's Users Society (Decus) during a recent Decus convention here. Some 600 Norwegian users elected an advisory board composed of representatives from the data processing, scientific and academic communities. The organization's 1985 charter will offer seminars on fourth-generation language development.

UNITED KINGDOM

HIGH WYCOMBE — A \$120 million race for an air defense system contract at Royal Air Force (RAF) command headquarters is under way here. According to a Ministry of Defense spokesman, four UK companies have been given the RAF's requirements, and the contract is expected to be awarded this year.

WEST GERMANY

MUNICH — A major change in the OEM agreement between Siemens GmbH and IBM Deutschland was announced here. Siemens will reportedly continue to market IBM's large disk storage device, the 3380, but it will no longer sell only to IBM customers. It will also sell to its own customer base and that of other plug-compatible manufacturers. The OEM agreement has been in existence since February 1984 and has not been popular among IBM sales representatives, sources said. IBM sales representatives have watched their colleagues at Siemens sell the same products at 15% to 20% less than IBM's prices.

Under the terms of the agreement, IBM users in West Germany will have to go back to Big Blue's prices and will start paying a lot more for IBM equipment.

NUREMBERG — The 1984 balance sheet for Triumph-Adler AG, the troubled Volkswagen GmbH high-technology subsidiary, registered only bad news. Approximately \$117 million was pumped into the company during 1984 to keep it going, but losses are expected for 1985 as well, insiders said. Under the terms of an OEM agreement with IBM, IBM's recently announced \$545 Actionwriter 1 Typewriter will be produced by Triumph-Adler.

MUNICH — Siemens AG has announced a \$6.6 million project to design integrated circuits intended for use in computer-aided design systems here. Siemens reached an agreement with West Germany's Society for Mathematics and Data Processing to collaborate on the research and development project and to involve various West German technical schools in the project.

MUNICH — The robot-manufacturing industry is betting on an annual growth rate of 30% this year, according to the Association of Robot Manufacturers here. This will primarily be due to an increase in demand from midsize industries, a group spokesman said. Some 6,600 robots were reportedly sold last year in West Germany — 40% of which went to the automobile industry.

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NEWS

Federal agency mining benefits from auditing system

LAKEWOOD, Colo. — A government agency is pouring between \$12 million and \$15 million in additional interest into the U.S. Department of the Treasury's pot each year through the use of an auditing and financial system and will add even more as the system is fine tuned.

Collecting minerals revenue paid by private industry to the Minerals Management Service (MMS) of the U.S. Department of the Interior has become more complicated in recent years, according to Robert Boldt, associate director of the royalty management program at MMS.

Boldt said the number of leases issued on federal and American Indian lands skyrocketed and as high production prices led to multiple ownership of producing mining wells.

He noted that the cornerstone of the government's program to correct long-standing problems with the royalty accounting, collection and management system is MMS' Auditing and Financial System (AFS), designed by American Management Systems, Inc. (AMS) of Arlington, Va. AFS is a fiscal and accounting system designed specifically to handle the collection of royalty payments, Boldt said.

Patched software

Until recently, MMS used the U.S. Geological Survey's Amdahl Corp. computer on a time-sharing basis, Boldt said. "The [royalty accounting system] software was over 25 years old and had been patched continuously," he said. The aging system produced confusing account statements that were difficult to interpret, he said.

The government was unable to identify or track late payments, nonpayment and underpayment. There was no way to reconcile the statements received from the lessee or royalty payer with the production reports received from the operators of a mining well, he added.

To make matters worse, the number of federal and Indian leases had increased from 11,127 in 1968 to more than 30,000 by 1983, Boldt said. Some royalty payments were taking three months to process, he added.

From 1971 to 1983, royalty collections on complex marketing agreements and pricing arrangements leaped from \$480 million to \$4.5 billion, an increase of more than 800%, he said.

Program consolidation

Boldt said the improved royalty management program was launched in 1980 to design AFS and a Production Auditing and Account-

ing System (Paas), also designed by AMS. The eight regional offices that had administered the old system were consolidated into a new facility, the Royalty Management Accounting Center, here in July 1981, he said.

Under the old system, companies submitted sales, royalty and production reports each month, Boldt said.

AFS requires one report from the lease operator that consolidates the sales and royalty data, he said. Companion production reports feed Paas, which reports on production for a lease from extraction to sale, he said.

Payers for each lease are given an account identification, and every selling arrangement is pinpointed,

Boldt said. Should one organization pay royalty on behalf of all the overriding interest holders, as often happens, the account is maintained for that organization, he added.

Revenue tracking

MMS can track a revenue source through the entire system from payment receipt

to distribution of the royalty, Boldt said.

Each of the interest holders in a mining well may make a separate selling arrangement, and each may receive a different price for output from the same rig, he explained.

The system can identify underreporting or nonreport-
See PAY page 31

IBM's best efforts are now going into Macintosh.

Macintosh and IBM PC software. Compatible at last, thanks to MacCharlie, a rather innovative coprocessing system.

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Nearly 10,000 IBM PC software programs designed for general business and specific applications in real estate, insurance, law, medicine, banking, etcetera, can now join forces with Macintosh's own popular programs.

And, the myriad of IBM PC-compatible software adopts Macintosh's many beloved features, including desktop utilities such as the clipboard and the calculator.

In addition, MacCharlie allows

IBM PC and Macintosh data files to be exchanged. Talk about flexibility.

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You see, MacCharlie delivers hardware compatibility, as well. For example, IBM letter-quality printers can be easily used with Macintosh.

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NEWS

June meet to eye Mac

SAN FRANCISCO — Apple Computer, Inc. Chairman Steven Jobs and Chief Executive Officer John Sculley will be among the speakers at Macforum '85, to be held here June 26-27 at the Hyatt Regency Hotel.

The conference, which will examine Apple's Macintosh Office strategy, is sponsored by Future Computing,

Inc., a Dallas-based market research firm. Other speakers will include Dennis Hayes, president of Hayes Microcomputer Products, Inc., and William Gates, chairman of Microsoft Corp.

The registration fee is \$800. More information is available from Future Computing, 8111 LBJ Freeway, Dallas, Texas 75251.

PAY from page 30

ing, and its reporting functions keep the MMS staff informed at all times on account status, Boldt said. In addition, the system will automatically identify situations where audits are warranted, he added.

Royalty distribution

The distribution of royalty amounts is recorded as soon as the sales and royalty reports are received, al-

though actual disbursement can be made at a later date, Boldt said. As long as the total amount collected matches the amount prerecorded to be disbursed, AFS will automatically disburse royalties to the various federal agencies, states and Indian tribes, he said. When the distribution of the royalty is recorded, the amount of the windfall profit tax is also calculated, he added.

When the system was first installed, hundreds of mil-

lions of dollars were suspended each month because of an error rate of approximately 40%, Boldt said. MMS has cut the error rate to 12% and is aiming to reduce it to 5% by early 1986 because the agency ultimately must pay states and Indians interest on the payments distributed late, he explained.

Paas, now in operation with 14 companies of various sizes, gives MMS the ability to reconcile production data with sales volume and royalty payment information, further improving the agency's ability to determine the precise amount of royalty due from a lease, Boldt noted. Paas will compare what the royalty payer says was sold with what the operator of a mining well says was produced, he said.

Bonus accounting

The Bonus and Rental Accounting Support System (Brass) evolved during the development of AFS and Paas when the responsibility for bonus and rental accounting for domestic minerals was transferred from the Bureau of Land Management to MMS, Boldt said.

Brass tracks information on approximately 144,000 nonproducing leases, he said, and computes how much is due in rents for each. It is compatible with AFS and adds its data to the AFS data base as each lease begins producing — when rentals end and royalties start — so that collection and accounting for royalties can begin.

AFS, Paas and Brass run on six Digital Equipment Corp. VAX-11/780 computers, Boldt said. Three are needed for AFS, one is used for testing and development and Brass and Paas run on one each of two that belong to MSS but are located at AMS' facilities, he added.

The systems are helping to eliminate underreporting, estimated at 1% to 2%, or \$100 million to \$150 million, per year, which Boldt said he ultimately hopes to recover.

"The main problem with the system is lack of capacity," he explained. "There is not enough on-line time, and our production cycles consume almost all the available batch mode time." MMS now has a request for proposal out for a mainframe so that it can handle all the modules on one system.

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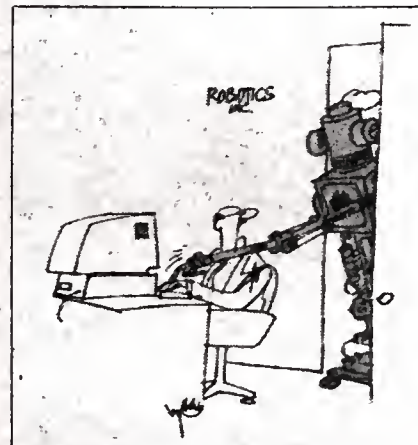
MacCharlie adds but a handful of square inches to Macintosh's physique.

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MacCharlie offers 256K RAM, with optional upgrade to 640K RAM; 360KB disk drive, and optional second disk drive.



"Do you mind?"

NEWS



TURNAROUND TIME

Larry Long

Q A month ago I hired a consultant who professed to be an expert in microcomputers and office automation.

She just submitted a bill for \$6,600 covering the first month's work — I fired her

on the spot. She was to have helped us establish a microcomputer policy, use her technical expertise to help us network clusters of micros and set up an educational program to help our users become more comfortable with personal computers.

She spent a lot of time on-site talking with almost everyone in the company and "reviewing" (I think learning) our software packages. For our \$6,600 she has "a

good understanding of what we do."

We assumed that she was on track and about ready to put everything together. But as of two days ago, she had nothing to show us. It was then that we realized that we were getting nowhere with this consultant. Is there any recourse to hiring an incompetent consultant?

If it's not too late, don't pay her. Otherwise, write the fee off as a contribution to experience and plan to be

more involved with the next consultant's activities.

The next time you retain a consultant, make it clear that you expect results. If you are paying top dollar for experience and know-how, you should see some visible signs of progress each day.

For example, a good consultant would have examined needs and prepared a draft microcomputer policy for your review by the end of the first week. Total billable time for such an activity should

be between one and two days.

Q My staff and I give presentations almost daily to users groups, the systems advisory committee or management on topics ranging from technology updates to budget proposals. Most of the meetings are no more than 1½ hours long. People have complained that we don't allow enough time for questions. How much time should be set aside for questions and answers?

The amount of time that you would allocate for interaction is directly proportional to the level of the audience. When making a presentation to top management, set aside about 60% of the planned time for direct interaction. Set aside 40% of the presentation time for interaction during mid-level management presentations and 20% for presentations to operational-level personnel.

Q Two years ago we were a company of 25 people; today we have over 100 and are growing rapidly. I am the chief financial officer and am also charged with the responsibility for automation. However, we have no computer center and I have very little knowledge of how computers are used outside of accounting and finance. Each division purchases whatever hardware and software they need to do business. As a result, we are decentralized in our use of computers. Fortunately, we have state-of-the-art hardware from a single vendor.

Our vendor has recommended that we purchase a mainframe and centralize the information processing function. Just about everybody has told me that they like it the way it is.

Would you recommend that we move in the direction of centralization or continue as we are?

There is nothing wrong with decentralization as long as someone has control. However, your company may be on a one-way street to embedded, autonomous operations that will be very difficult and costly to integrate at some time in the future. It is important that you begin now to coordinate the growth of your computing resources.

I would recommend a "centralized decentralization" approach. Eventually, if not now, you will want to network your computers while maintaining decentralized operation. Work toward this goal by centralizing control of such things as hardware acquisition, software acquisition and data management, as well as various programming, communications and systems standards.

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departments together, whether they're in one building or divided among several.

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The architecture is wide open.

Best of all, because WangNet is an open LAN, it allows you to tie most major office systems together. WangNet offers a transparent interconnection for over 300 switched or dedicated telecommunications chan-

nels, the IBM 3270 workstation-to-controller transport, and most video applications.

Considering all the information that's inundating today's office, there's no question that local area networking is a technology whose time has come. And with 50,000 people putting in a plug for WangNet already, the question is— isn't it time WangNet came into your business?

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NEWS



CALL FOR PAPERS

1985 CAUSE NATIONAL CONFERENCE

New Orleans, Dec. 10-13, 1985

A call for papers has been issued for this national conference which will address the current state and future of higher education computing from a planning and management perspective through seven professional presentation tracks. They are as follows: Track 1: Policy Issues in Higher Education; Track 2: Planning for Information Technology; Track 3: Special Environments; Track 4: Telecommunications/Networking; Track

5: Microcomputer Issues and Applications; Track 6: People Issues in Information Technology; and Track 7: Managing Academic Computing.

You are invited to send abstracts for papers to be considered for presentation at Cause '85 or to propose a panel of colleagues to discuss the various aspects of any of these topics. The deadline for abstracts is July 15, 1985, and should be sent to Cause, 737 29th St., Boulder, Colo. 80303.

SEVENTH ANNUAL CONFERENCE ON EDP PERFORMANCE MANAGEMENT

Scottsdale, Ariz., March 1986

Papers are now being sought for this conference which will be held in early March. Presentations are requested for but not limited to the fol-

lowing areas: integrating business and information system planning; capacity management approaches; the impact of personal computers and end-user computing on capacity management; information system's role in raising user productivity; organizing for performance management/capacity planning; future trends in information systems/performance management; improving communications with users/management; charging, pricing and cost accounting; workload forecasting for capacity management; distributed data processing and communications management; capacity planning implications of information centers; service levels and service agreements; performance considerations in system design; data base management systems performance issues; productivity in systems development; and scheduling

and production control.

Presentations should be management-oriented and approximately 30 minutes in duration. The deadline date is July 15, 1985. For more information on the conference, contact Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

EXPERT SYSTEMS IN CIVIL ENGINEERING

Seattle, April 7-11, 1986

This symposium will be sponsored by the Technical Council on Computer Practices, American Society of Civil Engineers. The three main themes for the symposium are as follows: tutorial on expert systems; application of expert systems to civil engineering; and developments in expert systems in civil engineering.

Prospective authors are encouraged to submit 200-word abstracts to Dr. Celal N. Kostem, Fritz Engineering Laboratory, 13, Lehigh University, Bethlehem, Pa. 18015; or Dr. Mary Lou Maher, Civil Engineering Department, Carnegie-Mellon University, Pittsburgh, Pa. 15213. The deadline for the submission of abstracts is August 1, 1985.

THE OFFICE SYSTEMS RESEARCH ASSOCIATION'S (OSRA) FIFTH ANNUAL RESEARCH CONFERENCE

Houston, March 22-23, 1986

A call for papers has been issued by the conference chairman for this fifth annual conference. The list of suggested topics includes but is not limited to the following areas: planning and conducting effective research projects; data gathering and analysis techniques; office automation case studies; office automation overviews; behavioral and psychological implications of office automation; environmental factors in the automated office; the impact of the microcomputer on office systems; new and emerging OA technologies; career opportunities in OA; collegiate education for the automated office; white-collar productivity; OA implementation strategies; factors involving VDTs; graphics; networking; and on-site vs. off-site office automation.

Papers and proposals should be submitted by August 15, 1985 to Mary K. Ruprecht, Conference Chair, Osra, 140 W. Myrtle St., Duluth, Minn. 55811.

INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING SOCIETIES (IFIPS) '86: 10TH WORLD COMPUTER CONGRESS

Dublin, Sept. 1-5, 1986

Ifips, the sponsor for this 10th computer congress, has issued a call for papers. The program has been divided into four main streams: design of components, applications, design of systems and informatics in a developing world. Within each of the four main streams there will be specialized subsections such as theoretical computer science, software engineering, distributed systems, artificial intelligence and computer-integrated manufacturing.

Papers are due no later than Sept. 1, 1985. For additional information, please contact David M. Hyatt, Data Decisions, Inc., 20 Brace Road, Cherry Hill, N.J. 08034; or Philip H. Dorn, Dorn Computer Consultants, Inc., 25 E. 86th St., New York, N.Y. 10028.

Kodak announces plain-paper printing: the lowest-cost retrieval you can buy.

Presenting the Kodak IMT-350 microimage terminal and the Kodak Starvue II reader-printer, the first image-management work stations from Kodak with the plus of plain-paper printing. And unmatched retrieval savings.

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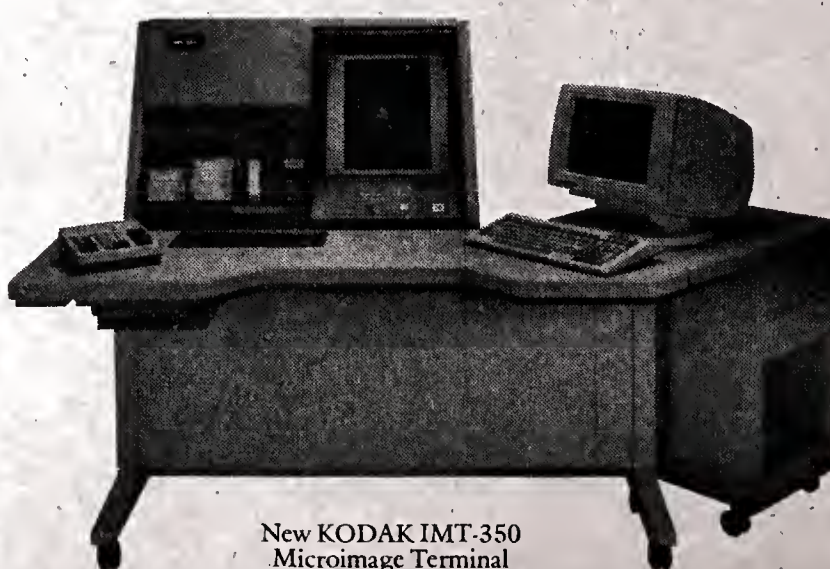
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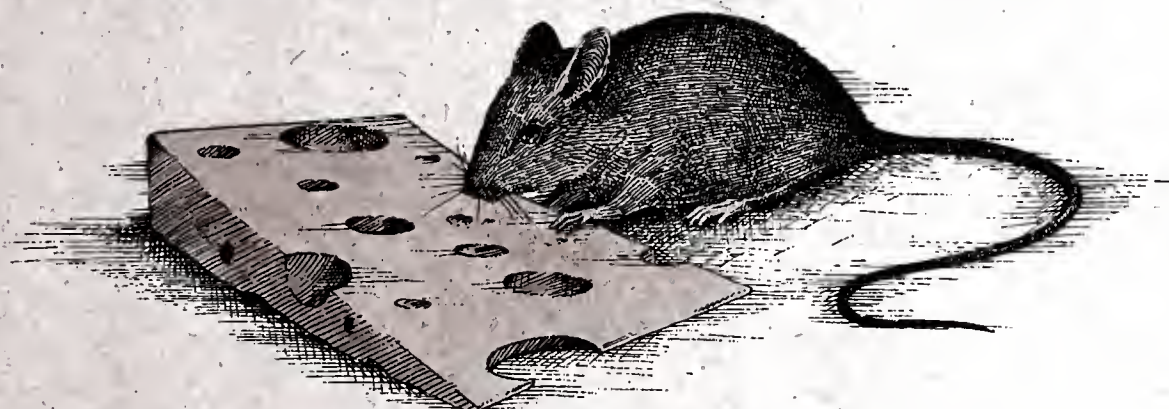


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PC's. Run them together and see if they work together.



You may well conclude that even though each of

the big three has succeeded in business, only one of them has succeeded at integrating business application software.

And if your company size is \$100 million in sales or more, this discovery could spare you the pain of much lost time and money over the next few years. Because when you acquire a half dozen systems that fit together in name only — but not in fact — you face six times the training, six times the delay and six times the anxiety.

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and masks lurking just below the surface.

While one offers the real thing. Millennium. A true family of systems in which the whole works as smoothly as any part. In which every package has the same query mechanism, the same report writers, the same screen generation, the same on-line documentation, security and real-time capabilities. So that when the packages are put together, there are absolutely no borders between them. They fit like pieces in a jigsaw puzzle. Making the most efficient use of all your data processing resources.

There's even a Millennium application development tool, so you can create new systems as you need them. Without slow, expensive programming.

Millennium means integration in fact. Not just in name.

And it is available only from McCormack & Dodge.

Of the big three in software, who's blind to integration and who's not?

When you see how they run, you'll know the answer.



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NEWS



CALENDAR

WEEK OF JULY 7

JULY 8, PARSIPPANY, N.J. — Introduction to the Personal Computer and Personal Computer Software for General Business Audiences. Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

JULY 8-9, BOSTON — Successful Teleconferencing Systems. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 8-9, WASHINGTON, D.C. — International Arms and Technology Transfer. Contact: Technology Marketing Society of America Seminars, c/o Technology Training Corp., Department IATT, P.O. Box 3608, Torrance, Calif. 90510. Also being held July 18-19 in Boston.

JULY 8-10, PARSIPPANY, N.J. — Job Control Language. Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

JULY 8-10, BALTIMORE — CICS Command-Level Programming. Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

JULY 8-11, LOS ANGELES — CICS/VS MRO/ISC. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 8-11 in Chicago, July 22-25 in San Antonio and Denver and July 29-Aug. 1 in Fort Lee, N.J.

JULY 8-11, SAN FRANCISCO — CICS/VS Application Design. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 15-18 in Boston, July 22-25 in Atlanta and July 29-Aug. 1 in Chicago and Los Angeles.

JULY 8-11, ATLANTA — Vsam: Its Structure and How to Use It. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 8-11 in Los Angeles and July 15-18 in San Antonio and Fort Lee, N.J.

JULY 8-11, BOSTON — CICS/VS Logic and Debugging. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 8-11 in San Antonio and July 15-18 in Los Angeles.

JULY 8-11, NEW YORK — Vtam: From Start to Finish. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 8-11 in San Antonio July 15-18 in Washington, D.C.; and July 22-25 in Los Angeles and Fort Lee, N.J.

JULY 8-11, FORT LEE, N.J. — IMS/DB (DL/I) Application Programming. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 29-Aug. 1 in New York.

JULY 8-12, WASHINGTON, D.C. — CICS/VS Internals. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 15-19 in Fort Lee, N.J., and in Los Angeles; July 22-26

in Boston and in San Antonio; and July 29-Aug. 2 in Atlanta and in Denver.

JULY 8-12, SAN FRANCISCO — Structured Systems Analysis Workshop. Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

JULY 8-12, DENVER — CICS/VS Application Programming — Command Level. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 15-19 in Atlanta, July 22-26 in Chicago and July 29-Aug. 2 in Fort Lee, N.J., Los Angeles and Washington, D.C.

JULY 8-12, FORT LEE, N.J. — CICS/VS Application Programming — Macro Level. Contact: On-Line Software International, Inc., Fort Lee

Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JULY 8-19, CHICAGO — Pick Operating System Workshops and Seminars. Contact: Jonathan E. Sisk, JES & Associates, Inc., P.O. Box 19274, Irvine, Calif. 92713.

JULY 9-10, SAN FRANCISCO — Data Communications II: Digital Communications Systems. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 9-10, PARSIPPANY, N.J. — Introduction to DOS for General Business Audiences. Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054

JULY 9-11, SAN FRANCISCO — Telecommunications Management. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 10, LOS ANGELES — IMS,

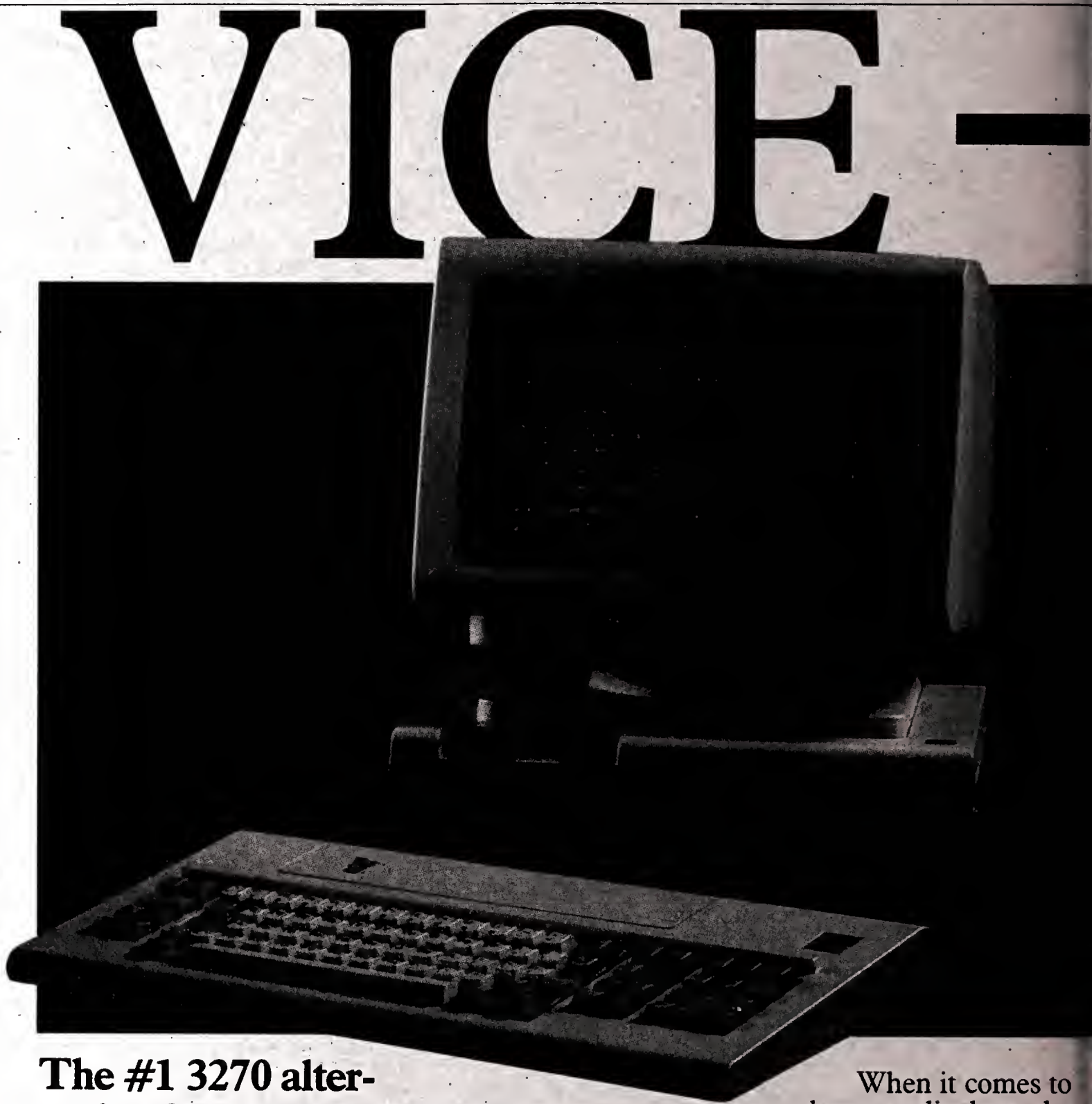
CICS and DB2: An Overview for Managers. Contact: Information Management Systems Consulting, Inc., Suite 305, 16601 Ventura Blvd., Encino, Calif. 91436.

JULY 10, LOS ANGELES — IMS, CICS and DB2: An Overview for Managers. Contact: Information Management Systems Consulting, Inc., Suite 305, 16601 Ventura Blvd., Encino, Calif. 91436.

JULY 10-12, NEW YORK — Information Systems Architecture. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

JULY 10-12, COLUMBUS, OHIO — C Programming Language. Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

JULY 10-12, SAN FRANCISCO — Local-Area Networks for the



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IBM World. Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

JULY 10-13, LAS VEGAS — The 60th Annual Convention and Trade Show of the National Office Machine Dealers Association (Nomda). Contact: Matt Kaufman, Nomda, 810 Lively Blvd., Wood Dale, Ill. 60191.

JULY 11-12, PARSIPPANY, N.J. — Utilities/IDCAMS. Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

JULY 11-12, DALLAS — Information Centers: End-User Computing. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

JULY 11-12, DOOR COUNTY, WIS. — First Annual Midwest Summer Computer Conference. Contact: Technology Consulting Corp., P.O.

Box 43, Sister Bay, Wis. 54234.

JULY 11-13, TAIPEI, TAIWAN — Asia-Pacific Regional Information and Micrographics Management Congress. Contact: International Information Management Congress, P.O. Box 34404, Bethesda, Md. 20817.

WEEK OF JULY 14

JULY 15-16, ARLINGTON, VA. — Micro Security '85. Contact: Conference Registrar, Computer Security Institute, 43 Boston Post Road, Northboro, Mass. 01532.

JULY 15-16, AVON, COLO. — How to Manage Data and Information as a Resource. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

JULY 15-16, DENVER — U.S.

West and Telecommunications in the Northwest and Rocky Mountain States. Contact: Telestrategies, Inc., P.O. Box 811, McLean, Va. 22101.

JULY 15-17, PARSIPPANY, N.J. — MVS Dump Debugging. Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

JULY 15-17, ATLANTA — Standard Network Protocols: International and National Packet-Switching Networks. Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held July 22-24 in St. Louis and July 29-31 in Boston.

JULY 15-18, CHICAGO — The 1985 National Computer Conference. Contact: Helen Mugnier, American Federation of Information Processing Societies, Inc., 1899 Preston White Drive, Reston, Va. 22091.

JULY 15-18, FORT LEE, N.J. —

IMS/DC (Data Communications) Programming. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 22-25 in Washington, D.C.

JULY 15-19, SAN FRANCISCO — Systems Workshop II. Contact: Ware Associates, P.O. Box 948, Groton, Conn. 06340.

JULY 15-19, SAN FRANCISCO — Structured Systems Design Workshop. Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

JULY 16-17, LOS ANGELES — Local-Area Networks. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 16-17, WASHINGTON, D.C. — Software Defined Network and Alternatives. Contact: The Yankee Group, 89 Broad St., Boston, Mass. 02110.

JULY 17, PARSIPPANY, N.J. — Introduction to the Personal Computer and Personal Computer Software for DP Professionals. Contact: Chubb Institute, 8 Sylvan Way, P.O. Box 342, Parsippany, N.J. 07054.

JULY 17-18, SAN FRANCISCO — Financial Analysis for Telecommunications Equipment Acquisition. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 17-19, AVON, COLO. — How to Build and Use a Data and Information Resource Directory. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

WEEK OF JULY 21

JULY 22-23, FORT LEE, N.J. — CICS/VS Performance and Tuning. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 29-30 in Boston.

JULY 22-24, CHICAGO — 1985 Summer Computer Simulation Conference. Contact: Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

JULY 22-24, CARY, N.C. — SAS Micro Language. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JULY 22-26, SAN FRANCISCO — Siggraph '85: The Twelfth Annual Conference on Computer Graphics and Interactive Techniques. Contact: Siggraph '85 Conference Services Office, 111 E. Wacker Drive, Chicago, Ill. 60601.

JULY 23-25, DALLAS — SAS Basics Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JULY 24-25, FORT LEE, N.J. — Recovery/Restart. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JULY 24-25, DALLAS — SAS Report Writing. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JULY 24-26, WASHINGTON, D.C. — Financial Information Systems: The New Generation. Contact: National Institute for Management Research Seminars, P.O. Box 3727, Santa Monica, Calif. 90403. **JULY 24-26, WASHINGTON, D.C. — Financial Information Systems — Integrating Personal Computers.** Contact: National Institute for Management Research Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

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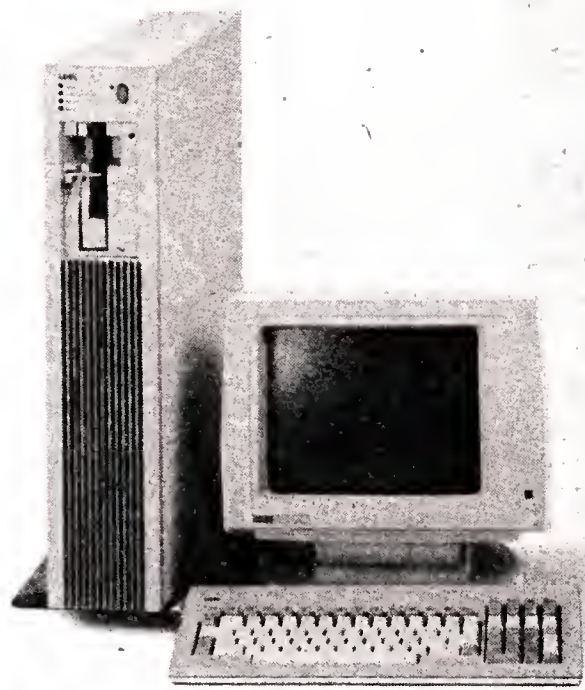
are still the 3270 standard and Telex is the #1 alternative . . . maybe it should be vice-versa. For more information contact John Hawkins, 6422 E. 41st Street, Tulsa, OK 74135/1-800-331-2623.

The #1
3270 Alternative

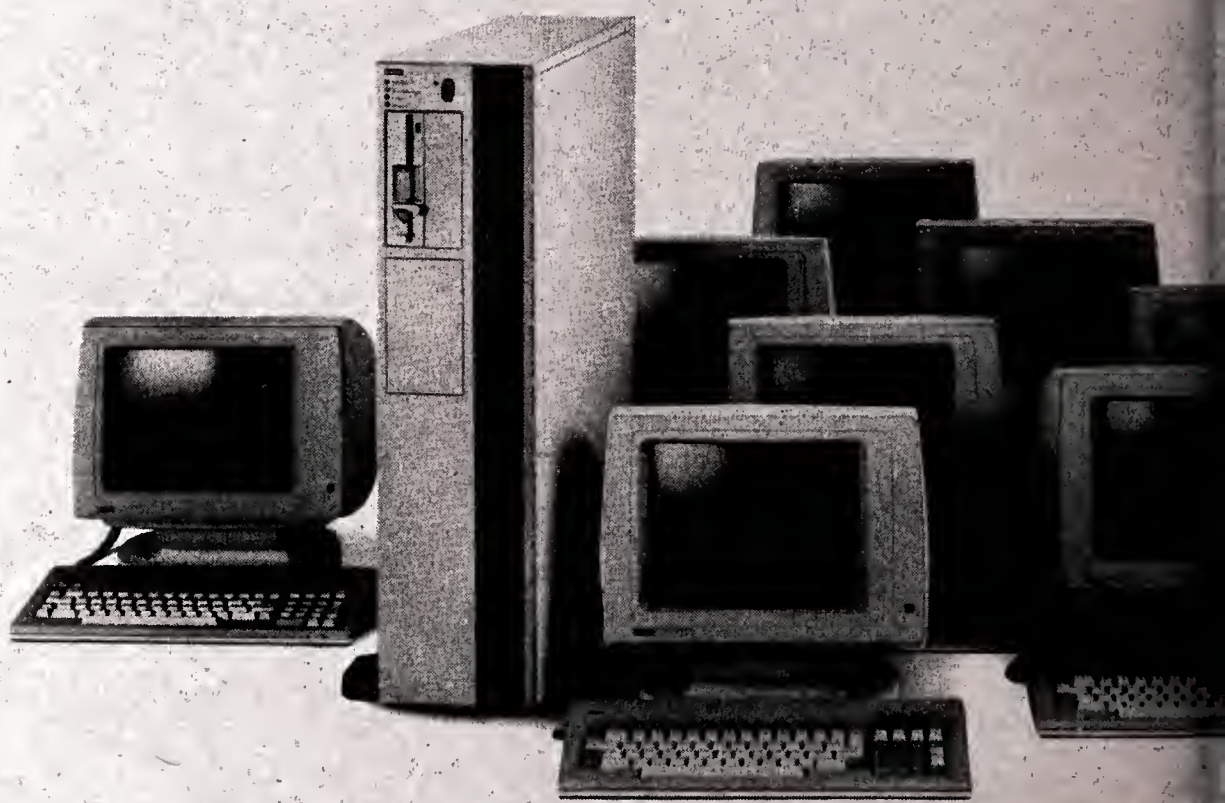
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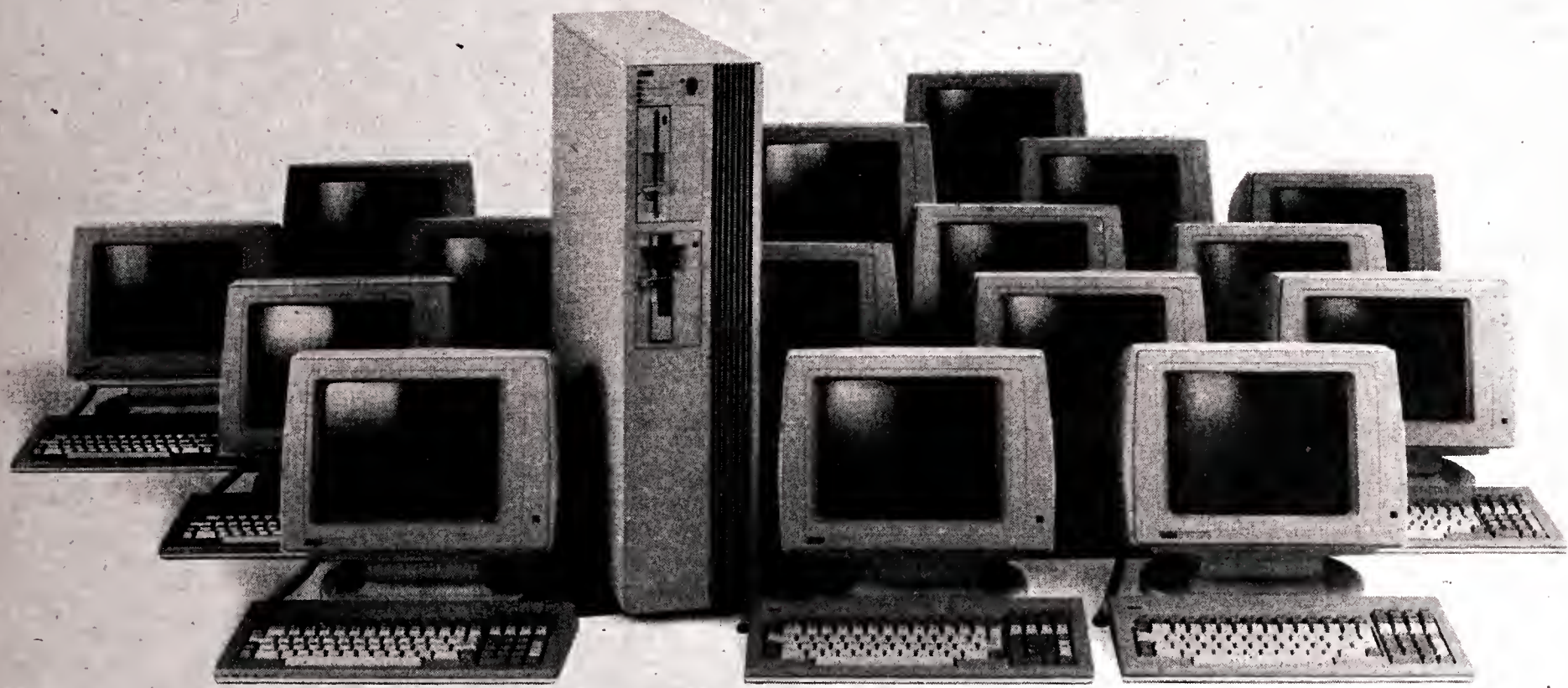
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Clarion call to a long war

The Association of Data Processing Service Organizations, Inc. has won the first battle in what promises to be a long war against software piracy.

Adapso recently announced an out-of-court cash settlement in which American Brands, Inc. admitted that its subsidiary, Wilson Jones Co., engaged in unauthorized duplication of three software products from Micropro International Corp. — Wordstar, Mailmerge and Spellstar [CW, June 3]. Adapso and Micropro had filed a 20-count complaint against the \$7 billion American Brands in January [CW, Jan. 21], seeking \$225,000 in damages and the return of any profits earned as a result of the alleged copying.

An Adapso spokesman said Wilson Jones agreed to pay an unspecified cash sum to Micropro and also agreed that "appropriate procedures will be instituted to [ensure] against such improper duplication."

We — and apparently Adapso, too — had expected the suit to travel a long path through the courts. The out-of-court settlement, while anticlimactic, nevertheless dramatizes the serious intent of software vendors to prosecute those who illegally copy software, even though theft occurs without the knowledge or acquiescence of corporate executives, as in the American Brands' case.

Software piracy is big business in this country. Roughly half of all microcomputer data base, spreadsheet and word processing programs in use are illegally copied, according to a study by Future Computing, Inc. [CW, Jan. 21]. Illegal software duplication cost U.S. vendors an estimated \$1.3 billion in lost revenues from 1981 to 1984 and is expected to cost them another \$800 million this year. The validity of the numbers in this study has been attacked, but the numbers nevertheless give some indication of the magnitude of the problem.

Considering the vast sums at stake and the success of the Adapso filing, we would expect more lawsuits to follow. Not that prosecution is the best way to proceed. Marv Goldschmitt, vice-president for business development at Lotus Development Corp. and chairman of Adapso's Software Authorization Committee, said that a lawsuit is a last resort for preventing piracy and is the least desirable tactic. But that tactic does seem to get the attention of top corporate executives.

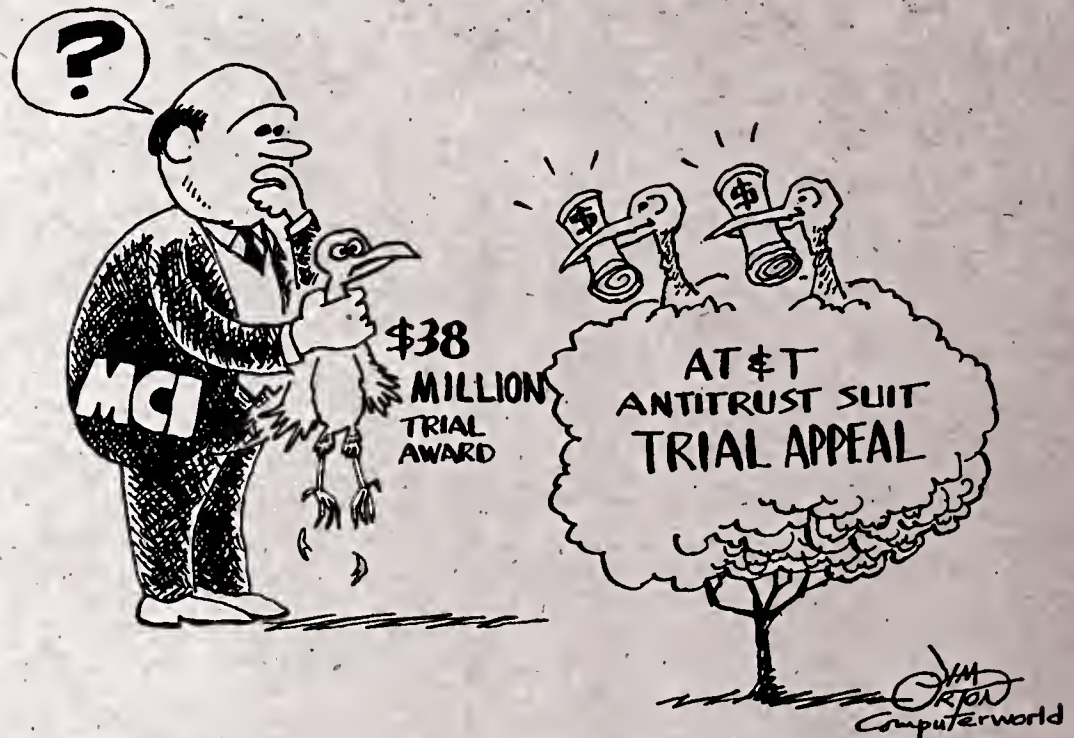
Meanwhile, Adapso is also proceeding with an extensive publicity campaign. The association has mailed about 60,000 brochures to chief executive officers and chief legal counsels, detailing liabilities of software piracy and urging establishment of formal antipiracy policies.

The third prong of attack is the association's controversial proposal for a microcomputer software protection key scheme that is now only in draft form but is already meeting resistance from the user community.

Each of these steps may help combat software piracy in the short term. But even the American Brands case has left one question unanswered: Who is ultimately responsible for custody of software? The CEO? The data processing department? The end user? The manufacturer?

We encourage Adapso to continue its anti-piracy efforts, whether they be through public relations or legal action. The long war has just begun.

EDITORIAL



LETTERS

DOD's resources not so abundant

In the column "Credibility gap undermines user confidence" [CW, April 8], the author may know the U.S. Department of Defense "to possess truly unlimited funding for data processing power and all the management and technical brains to go with it," but I didn't see much evidence of it while I was on active duty in the Air Force from 1972 to 1976.

I started my duty working on Sage, a vacuum tube museum piece that managed air defense until 1982. The machine had a 6 million instruction/sec. cycle time. It was rumored that spares were to come from Czechoslovakia, because no free-world company made the tubes.

I moved from Sage to a relatively modern Honeywell, Inc. 200 with a tape-based operating system. The printer was used constantly for up to

eight hours a day when it wasn't broken, and it was broken often. In order to replace it with a surplus printer from another site, I had to go through heck. First, I got the Honeywell maintenance manager to refuse further contract maintenance on it. Then, I got the environmental engineers to certify it as a noise hazard. Then, I had to get a price from Honeywell on refurbishing it at the factory. Finally, I got lucky and knew the captain who had to OK the deal at higher headquarters. He took my word for it that the printer had to go. The cost I was justifying was \$25/mo in increased maintenance. Honeywell hated the old printer so much that it had offered free installation on anything I could get that was in better condition.

My point is that the computer resources in the military were neglected systematically from the

See LETTER page 42

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VIEWPOINT

The heroes, victims of technology's fantasia



**LECHT
ON SCIENCE**
Charles P. Lecht

This column is dedicated to the growing legion of information systems managers. To those of them still with us, I offer a hymn of praise to their survival capabilities. To those who have given up the ghost in their struggle to keep afloat in the technological flood of the '80s, this is a requiem.

Today's information systems manager may be forgiven if he is found treading water or even swimming against the current in the mighty river of technology that is gushing into corporate facilities. Managing its effective application and looking like you know what you're doing is no easy job. The increased arrival speed of cost-effective innovations is shortening the time periods that may be covered by plans so much that information systems managers seem myopic to their superiors.

As the definition of "long range" condenses from five years to three, two or even one year and the definition of "short range" does so commensurately, the number of disruptions in information systems production rise. Many top managers don't consider that the net effect of each disruption and the cumulative net effect is diminishing on an annual basis.

The old system conversion process was a traumatic event and frequently involved tossing the manager out with the replaced system, as if this would lessen the trauma.

Times have changed. Any shortsightedness around these days is likely to be found upstairs. Most corporate officers act surprised when they

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

are informed that conversion to a new system is required and that production will decrease as a result. In the past, the officers could defer both by sending the manager who asked for the conversion on a quest from which many hoped he'd never return. Today, many have found that deferment may be dangerous to their corporations' health and to their benefits and are thinking twice about sending anyone on such a quest for too long.

Two questions to be answered

The quest involved a fact-finding mission to help corporate management decide whether or not the manager's request was to be honored. The subsequent report was always boiled down to answering two key questions: The first was whether a date could be predicted when the preconversion production levels could be surpassed; the second related to whether the newly installed system would last long enough to obtain a profit. Answering either question was predicated upon a marketplace that, in some way, was synchronized with production and where little surprise could be expected from the competition.

Today's corporate management demands that conversions to new computer and communications facilities be justified by classic return on investment criteria, and this can impede the corporate information systems department enough to render it useless.

The pace at which new and cost-justifiable hardware has entered the user marketplace verifies this conclusion. Consider the IBM Personal Computer line: The speed with which IBM's Personal Computer AT followed the Personal Computer and Personal Computer XT was dazzling.

Most corporate officers are used to receiving a plan that answers the two questions I mentioned, but they are truly unable to understand why it's getting harder and harder for the information systems manager to provide those answers. In the time it may take to gather this information, a generation of hardware improvements may have been

missed. There are those who call for a slowing of the pace of hardware introductions to remedy this, but any purposeful retardation of technological innovation is unthinkable these days.

Predictions become risky

It doesn't take too much imagination to see that predictability in the creation of corporate information systems plans must suffer in today's fast-moving scene. It takes so long to create such plans in some corporations that, once the plans are approved, the manager attempting to do so appears more of a historian than a planner. It is unfortunate that predictability is being eroded by change just when management practice in the appraisal of employee performance is so stagnant. It makes any sort of risky prediction dangerous to the planner's career.

Our industry has never been known for its predictability. Even in the best of times, creating plans and asserting their lasting quality has always been considered adventurous if not dangerous. Making predictions today — especially those labeled as long range — is, no doubt, riskier than ever.

Perhaps the only thing predictable today is that managers who create such plans will have to defend them by facing the fire of corporate politics. Many of those who do will be sent to a firing squad of incompetent corporate politicians. If retirement benefits are at stake, the politicians will be accompanied by their watchdog lawyers to ensure that their victims die of poverty, whether or not they deserve it.

We can only offer our prayers to the brave manager who still believes in corporate heroism and still attempts to create long-range plans while swimming in a technological flood. And we praise him if he finds himself labeled as more than stupid. And if his reward is to be labeled as nothing more than a janitorial Mickey Mouse, unable to comprehend today's fantasia of sweeping change, we say better luck next time.

Advanced DP training requires attitude adjustment



HUMAN CONNECTION
Jack Stone

A short while ago, I had the dubious pleasure of conducting a hands-on training class in "advanced" data processing systems for a contingent of office administrators employed by a large organization. The prerequisites for entry included formal class work in word processing on the same equipment, plus a minimum of six months hands-on experience in word processing applications.

Unfortunately, the entry requirements were not nearly stringent enough — but not in areas that I had anticipated. What my group members needed was some attitudinal realignment before they were allowed to attend the session.

All of the attendees were indeed knowledgeable of the basic WP functions: create, edit, print and others.

Stone is a Washington, D.C.-based independent management consultant, educator and writer, specializing in DP human communications and personnel development.

But the members of the group were woefully short of the capabilities that fell in the general realm of "advanced" functions — those skills necessary for effective use of the data processing system — even though most of them had used the equipment for more than two years.

In a way as tactful as possible, I asked the class its views on why there exists a lack of knowledge of the advanced functions. Our dialogue on the subject went something like the following:

Class: "Our organization is responsible for providing users with the training necessary to perform on the job. Management arranges for basic training both on the premises and with outside vendors, but we nevertheless need classes in many of the advanced topics. Without such classes, we are unable to learn how to use the equipment in these areas."

Class leader: "I don't believe you're giving yourselves enough credit for your intellectual ability.

After all, the hardest part of word processing is to develop typing skills. Thereafter, the functionality is virtually all automatic. Naturally, you must learn what buttons to push to achieve processing objectives and extend your thinking a tad beyond conventional word processing, but is this

”
*Is allocating some
of your personal
time to your em-
ployer's computer
training endeavor
too great a sacri-
fice?*

all beyond your learning disciplines?"
Class: "Of course not, but we are not given time off to pursue training on our own. We are completely occupied by the day-to-day pressures, and any lull in the workload is used for breathing purposes and not for learning new computer bells and whistles."

Class leader: "What is the difference between your working environment and those environments elsewhere? Office workers everywhere have their shoulders to the grindstone and are being directed to turn out more product in less time with fewer compensations."

"There is an alternative way to handle training. Perhaps it is an

anathema in today's office world, but there is the concept of investing your own time, outside of business hours, to learn new features and capabilities of the machinery. After all, there are vast numbers of office professionals to be trained in a wide range of information-handling subjects, and the needs are certainly ongoing as systems are updated. Surely, one's employer cannot be expected to foot the entire bill for computer training, particularly because the individual benefits from the experience beyond the confines of the current job. Doesn't it make sense for the employees to share in this responsibility and commit some of their own time to the process?"

Class: "But you don't understand. We put in a very long day, and we are exhausted by the time we drag ourselves through the front door at night. This is hardly conducive to sitting in front of a terminal and/or reading high-tech literature. Furthermore, we want to spend more time with our families and less time worrying about the job. Finally, most of us are in car pools and it would be very inconvenient to stay late in the office."

Class leader: "I fully recognize the difficulties and problems associated with this. See CLASS page 42"

VIEWPOINT



LETTERS

Take a look at the market

I would like to respond to several points Adam Osborne made in his letter "Pundits' analyses refuted" [CW, May 13].

First, I made no attempt to "tell the world inaccurately what [Osborne is] doing." I merely stated my view of the software marketplace, which happens to differ markedly from his.

Second, I stand by the statements I made in the article to which Osborne referred [CW, March 18]. There may exist a small segment of potential word processing software purchasers who are willing to accept limited functions based on a six-year-old technology. However, Infocorp's studies show a significantly larger

segment of word processing buyers are willing to pay for advanced functions.

Osborne should know from painful past experience what happens to a computer company that attempts to foist products based on outdated hardware technology on an increasingly sophisticated buying public: The public buys the new technology.

The same is true for software. Document processing software that features scanned input of both text and images, electronic mailing to noncompatible word processors, combined text and graphics editing, built-in arithmetic, laser printer support with a wide variety of fonts, form-letter generation facilities and built-in spelling and grammar correction will be commonplace within a year. When Osborne's company ships a fully tested, well-documented, bug-free software package with all of these features for less than \$100, I will be the first in line to buy a copy.

Robert M. Lefkowitz
Cupertino, Calif.

CLASS from page 41

ated with self training on an after-hours basis. On the other hand, the reality of the situation is simply that most organizations do not have the resources to conduct lengthy training programs and that most future needs will have to be met from your own initiatives. Nearly all employers will provide access to machines, textbooks and ancillary self-training materials at no cost to the employees,

which is certainly a major contribution. Is allocating some of your personal time to the endeavor too great a sacrifice?

"You will surely benefit from your labors since the added knowledge will hardly hinder your work productivity or professional development. As a final note, the success of many computer professionals owes, in part, to endless days and weeks of home study, which is considered an essential part of the job." ‡

Good luck with personnel

I feel so sorry for David Dorbandt from the description in the article "Out of work at 46, manager sets DP skills on new course" [CW, May 6]. He, of course, has the right attitude and a positive outlook.

However, no one has the slightest interest in his theory that his experience is transferable and that he is a highly skilled, well-trained manager of high-technology computer projects.

Most of his time and effort will be directed at communicating with the world's greatest ignoramuses: personnel departments.

These infamous (and justly so) dunderheads will have absolutely no idea what Dorbandt is talking about nor will they care. Their only interest

will be in filling a job order to the letter. Dorbandt will never speak with a technically oriented person with the authority to hire him unless a minor miracle occurs.

Again, I wish him great luck in his search, but he is better off if he agrees to take half his last salary and learn how to type and shuffle a lot.

L. A. Brown
New York

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LETTER from page 40

start of the war in Viet Nam until roughly 1980. The lower level people, from company grade down, struggled mightily to keep the junk running. The field-grade officers (majors and above) were mostly former pilots and radar surveillance types who didn't realize how bad the situation was or tried to keep a stiff upper lip in the face of disaster. Congress would fund only weapons procurement and not too much of that after 1972.

The procurement systems that everyone complains about now were definitely among the systems neglected. Until recently they were based on punched cards.

The lessons to be learned from the current DOD credibility problems are relevant to the costs associated with postponing system modernization in order to save on current expenses. In the long run you get creamed because your systems fail to provide needed information.

MIS managers faced with such cuts should make sure they explain the risks to senior management and get the heavy hitters to take the responsibility, preferably in writing. MIS managers who fail to make clear the long-term costs of delayed modernization will experience the "credibility gap" that the DOD has now.

Douglas Bohrer
Wilmette, Ill.

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Processor	Motorola 68010, 10 MHz clock speed, 32-bit processing, 16-bit data bus
Operating System	UNIX System V
Memory	512K expandable to 2 MB, Virtual Memory
Disk Storage	1 ½MB 5¼" double sided/double density drive (unformatted) 10 MB or 20 MB hard disk (formatted)
Communications Devices	1 RS 232C serial, 1 Centronics parallel, 2 Tip/ring line jacks (with cords) 1 Telephone set jack, 1 300/1200-Bps modem
Expansion Slots	3
Display Screen	12" diagonal screen, Monochrome green on black phosphor, 720 x 348 pixels, 80 columns x 29 rows, Reverse, underline, blinking, and high intensity



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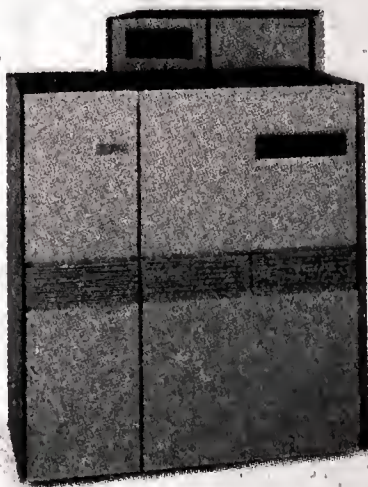
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SOFTWARE & SERVICES



Nicholas Zvegintzov

Programmers don't like it, most corporations don't pay enough attention to it, vendors have trouble selling tools for it, and yet more than half of the data processing resources in most organizations are consumed by it. Software maintenance — any change made to a program after it is delivered — is a necessary evil. It is rapidly becoming one of the most important issues facing a DP department.

Computerworld senior writer John Desmond discussed maintenance issues, training and tools in a recent interview with Nicholas Zvegintzov. Zvegintzov is the editor of "Software Maintenance News," a monthly newsletter published by the Software Maintenance Association, a nonprofit corporation dedicated to enhancing the understanding of software maintenance.

Q What's new in software maintenance?

We're seeing a [newer] approach to dealing with computing than we saw 10 or 20 years ago. We now have a generation of people who were born into computing as a technology that exists. Dealing with existing systems means you deal with a situation you inherited.

The statistics of how software maintenance is staffed suggest that people dealing with existing systems today are younger and better educated than DP professionals as a whole.

Q What are the keys to improving software maintenance?

First, an attitude that we need to pay attention [to maintenance]. Second, the greatest challenge in software maintenance is to have people understand what large systems are doing. If you're a programmer told to maintain a banking system, the first focus has to be on how the system really works. We need more analytical tools that enable the programmer to look into the system. Third, we need support for the idea that modification and maintenance tasks come in a variety of sizes. Maintenance programmers are always told to get it done as quickly as possible.

Q Is code written in a fourth-generation language easier to maintain?

A hundred lines of code is always easy to maintain. It's when you get 10,000 lines . . . that maintenance becomes hard. I hear horror stories about

See **INTERVIEW** page 70

SOFTLINE/WILLIAM INMON

Dual data base: the right step?

One of the major issues facing many DP shops today is the dual-data base dilemma. To have dual data bases or not to have them; that is the question.

The dilemma stems from the belief that shops should have one data base management system for operational processing and another for decision support or information center-type processing. Some vendors loudly proclaim that the single data base approach is the best solution, while

See **INMON** page 68

Inmon is a director at Coopers & Lybrand in Denver, a noted author on the subject of data base design and a regular contributor to Softline.

■ Computer Corp. of America is developing software to link its Model 204 DBMS with Computer Associates International's Advanced Business Software line/**48**

■ Project planning and management software for engineering and construction applications was offered by Harris for its line of superminicomputers/**48**

■ Prime introduced facilities management software for its superminis under Primos/**48**

INSIDE

Systems Software/**50**

Productivity Aids/**50**

Application Packages/**52**

DSS buyer — Know thyself

By Maura McEnaney
CW Staff

WASHINGTON, D.C. — Selecting the right decision support system (DSS) means knowing first how decisions are made within your company.

At a recent Digital Consulting Associates, Inc. seminar here on DSS, the instructor, John Wark, director of systems software for Walker Interactive Products, Inc., advised managers to examine carefully the way users communicate data before they establish the criteria to be used in selecting a DSS package. If managers are currently exchanging hard-copy graphs and financial spreadsheets, for example, those capabilities should be emphasized in the DSS, he said.

And, to be most effective, a DSS package

See **DSS** page 69

Advertisement

Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as the standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language — each one painting the user into

its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes*? Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE are identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware

and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350 ext. 1060.

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SOFTWARE & SERVICES

Prime unveils facilities management aid

NATICK, Mass. — Prime Computer, Inc. has introduced facilities management software for its line of superminicomputers running the Primos operating system.

Facilities Management+ (FM+) was developed by Micro-Vector, Inc. and consists of five integrated modules in the following three products: FM+ Planning, FM+ Tracking and FM+ Leasing.

The product is based on Prime's Information data base management system and can be used alone or in conjunction with the architectural design module of Prime's Medusa software, according to a Prime spokesman.

FM+ Planning consists of a Space

Projection module that reportedly allows users to evaluate the effects of an organization's growth. Managers can query the data base by organizational level, office type or personnel code and then modify space accommodation plans.

A Vertical Stacking module is said to help users determine the placement of groups by floor or building.

FM+ Tracking includes an Equipment Management module that maintains an inventory of furniture and equipment, the vendor said. A Project Budget module provides billing information for contractors involved in a renovation project, according to Prime.

FM+ Leasing aids in the manage-

ment of property leases, allowing users to maintain information on maintenance costs, parking availability and security levels.

FM+ facilitates report generation and data base searches. All modules are integrated, permitting data sharing between products.

FM+ Planning ranges from \$14,000 to \$19,000 in price; FM+ Tracking ranges from \$8,000 to \$12,000; and FM+ Leasing costs between \$8,000 and \$12,000, Prime said.

The products will be available in August.

For further information, Prime is located at Prime Park in Natick, Mass. 01760.

Harris offers project tool for supermini

FORT LAUDERDALE, Fla. — Harris Corp. has announced the Project Planning and Management System (PPMS) for planning and management of projects in a range of engineering and construction applications. The package runs on Harris superminicomputers.

The menu-driven PPMS allows project and line managers to evaluate plans, optimize plan execution, maintain project schedules, facilitate communication between departments and staff, estimate costs and control budgets and plan and manage resources, according to a vendor spokesman.

PPMS includes a report writer and color graphics formats for project data presentations.

Multiple project data can be stored with PPMS to serve as many concurrent users as the host Harris system allows.

The number of users able to be accommodated ranges from 32 users on a Harris 60 to 200 users on a Harris 1000.

The PPMS software system costs \$90,000 with a \$900 monthly maintenance fee.

Harris is located at 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

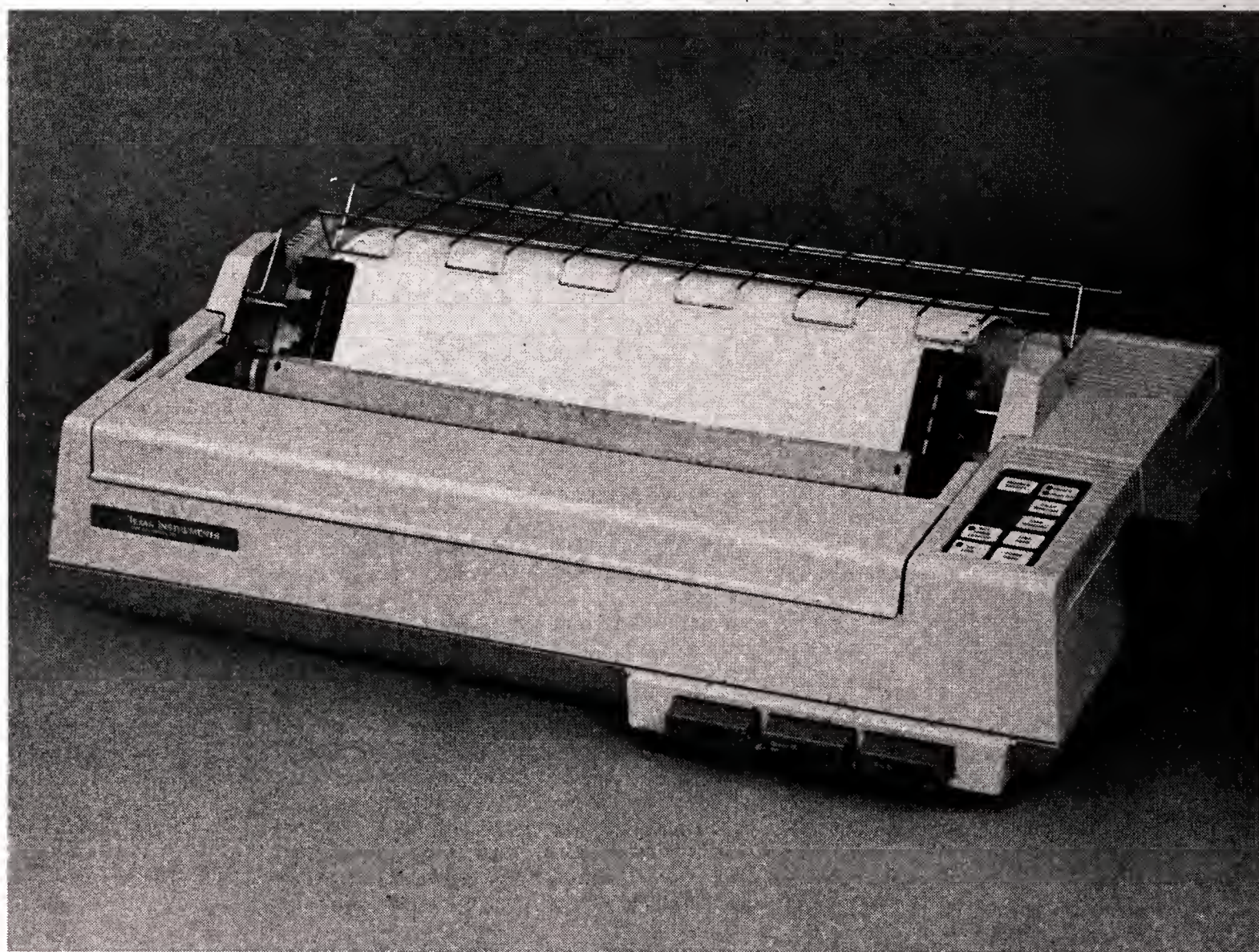
CCA, CAI plan to make module

CAMBRIDGE, Mass. — Computer Corporation of America (CCA) has entered into an agreement with Computer Associates International, Inc. (CAI) to develop an integration module for CCA's Model 204 data base management system and CAI's Financial Management and Distribution Management software for IBM's OS, DOS and VM/CMS operating systems.

The integration will allow the applications from CAI's Advanced Business Software line to access Model 204 files directly, rather than going through IBM Vsam files, a spokesman said. CAI's Advanced Business Software is a series of integrated applications including order processing, inventory control, sales analysis, purchasing, general ledger, accounts payable, accounts receivable and asset management.

The Model 204 integration module will be available in September and will cost \$250,000.

CCA is located at Four Cambridge Center, Cambridge, Mass. 02142.



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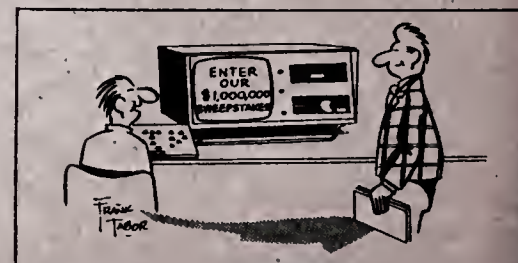
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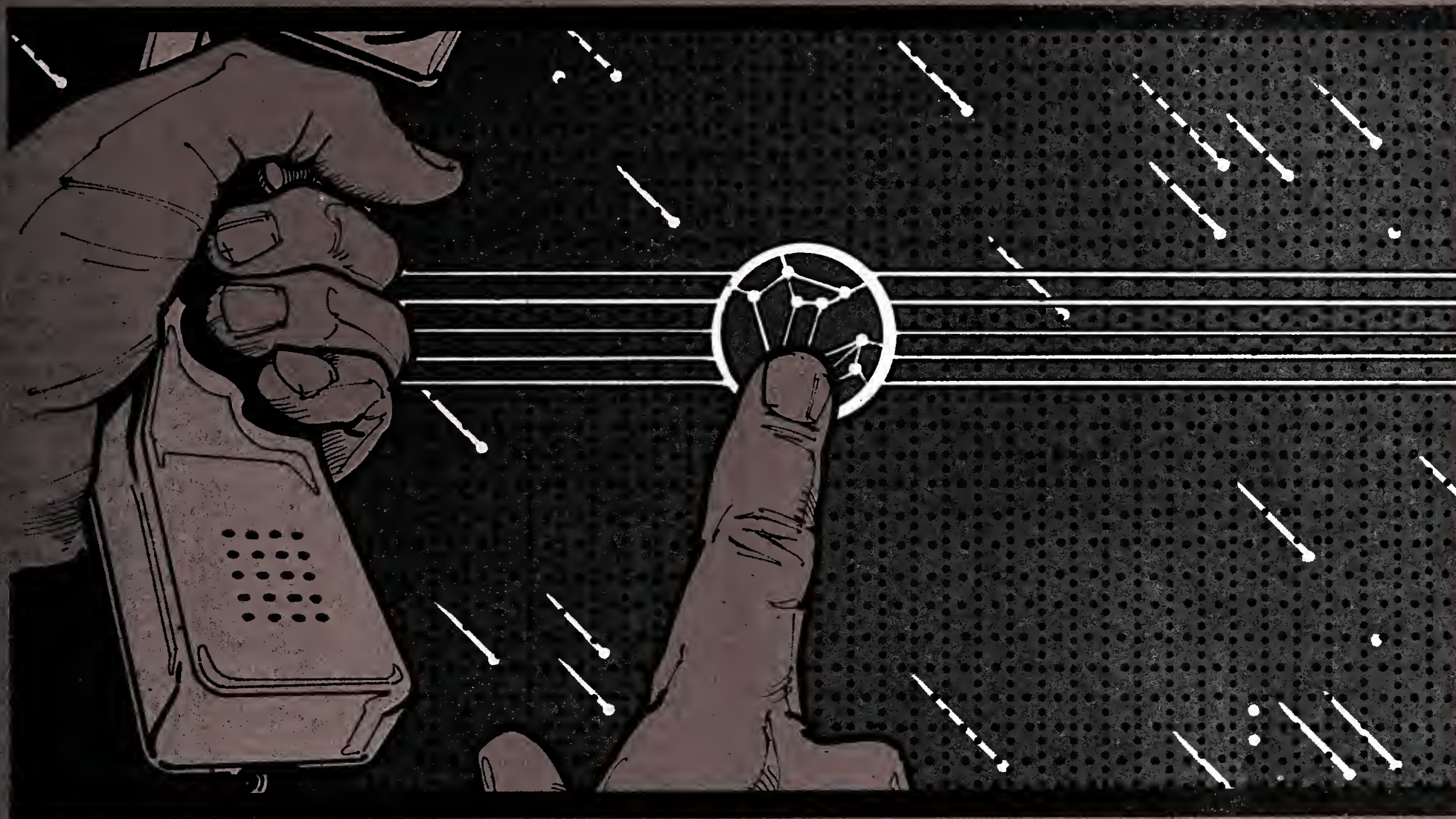
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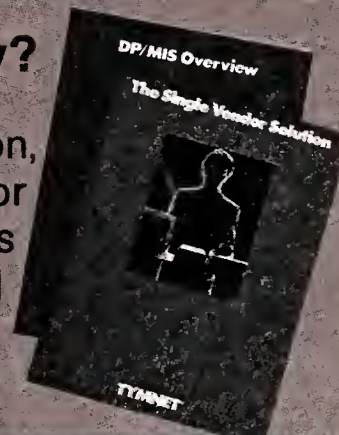
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SOFTWARE & SERVICES

SYSTEMS SOFTWARE

■ Compuware Corp. has announced Debug-Aid, an interactive test and debugging facility for IBM CICS under IBM's DOS and OS operating systems.

Debug-Aid includes three levels of transactions: a Debug level incorporating Help screens for inexperienced programmers debugging Cobol programs; a second level for Cobol and assembler programs that allows programmers to browse CICS tables and areas and permits screens to be viewed at remote locations; and Sbug, which allows systems programmers to browse and modify CICS tables and areas and perform analysis on "hung tasks."

Debug-Aid is priced from \$9,000 to \$17,000, depending on configuration.

Compuware, 32100 Telegraph Road, Birmingham, Mich. 48010.

■ Verdex Corp. has announced that its Verdex Ada Development System (Vads) is now available for Sun Microsystems, Inc. Sun-2 workstations.

Vads is a development system that consists of the company's U.S. Department of Defense-validated Ada compiler and a set of software development tools that includes an interactive, screen-oriented symbolic debugger, library management tools and runtime system.

Vads is also available for Digital Equipment Corp.'s VAX series running Unix BSD 4.2 and the DEC Ultrix operating systems.

The cost of Vads on the Sun workstation is \$7,500.

Verdex, 7655 Old Springhouse Road, McLean, Va. 22102.

■ Tower Systems International has announced that its Epic/VSE data set management system is now compatible with IBM's VSE SP2.1 operating system.

Epic/VSE allows companies to manage, secure and report on tape

and disk data set resources, the vendor said. It includes an on-line display and maintenance capabilities for IBM Vsam catalogs. It can allocate disk space and provide disk and tape work data sets for intermediate data storage.

Epic/VSE for IBM's VSE/SP2.1 leases for \$325 per month.

Tower Systems International, Suite 365, 19782 MacArthur Blvd., Irvine, Calif. 92715.

■ SKK, Inc. has announced Multipak/VM, a productivity tool for the IBM VM operating system.

Multipak/VM consists of a Spool Viewer facility that allows users to display spool files on an IBM CMS-based terminal. The utility displays print and punch files. File attributes can be changed by keying over selected fields.

A Short Cut utility is said to simplify CMS use by guiding users through a multilevel system of command panels. The Screen Painter facility enables users to build full screen application panels by laying out screens as they are to appear. Stretch Edit allows data sets from IBM's MVS or OS/VS1 to be copied onto CMS files without losing the line that is displayed.

Multipak/VM costs \$8,000.

SKK, 10400 W. Higgins Road, Rosemont, Ill. 60018.

■ Intrak, Inc. has introduced Fastneat, a compiler for NCR Corp. V series mainframes under the VRX operating system.

Fastneat is an enhanced version of NCR's Neat/3 compiler, which was acquired by Intrak. It reportedly operates 30% to 50% faster than Neat/3 and is compatible with NCR's Expanded Disk Addressing disks. The product is both source and object code-compatible with the NCR compiler.

Fastneat costs \$4,000, according to the vendor.

Intrak, 6841 Convoy Court, San Diego, Calif. 92111.

■ Goal Systems International, Inc. has announced FAQS/XP Version 6, featuring additional reports, extended support for IBM 3179 and 3279 color terminals and improved password support for better security control. The software runs in IBM DOS/VSE environments.

FAQS/XP is intended to better DOS system throughput by improving on-line transaction performance and Dads scheduling and by enhancing console spooling and partition balancing.

According to a spokesman, Version 6 features an improved Console Spooling Facility with the addition of a job accounting report showing CPU seconds, start I/O activity and partition Getvis use for each step in the job, as well as a report showing each phase loaded during job execution.

FAQS/XP Version 6 is priced at \$4,760 for a permanent license, or \$119 per month for a three-year renewable license.

Goal Systems International, 5455 N. High St., Columbus, Ohio 43214.

PRODUCTIVITY AIDS

■ Dylakor, Inc. has announced Dyl-Online, an interactive program development tool compatible with the company's DYL-280 and DYL-280 II packages. Dyl-Online runs in the IBM MVS/TSO/ISPF environment.

The menu-driven Dyl-Online provides a series of prompts to help users select the functions desired, a spokesman said. Users can choose from three levels of assistance in designing programs. Maximum assistance is provided in the first level, while the third level allows users instant access to IBM's ISPF editor.

Other features of Dyl-Online include automatic job control language generation and syntax checking.

The Dyl-Online system is priced at \$17,000 for DYL-280 or \$21,000 for DYL-280 II.

Dylakor, P.O. Box 3010, 17418 Chatsworth St., Granada Hills, Calif. 91344.

■ DBMS, Inc. has announced an automated programming standards package for users of Release 10 of Cullinet Software, Inc.'s IDMS data base management system.

The Quality Assurance Tool Kit reportedly provides data base administrators with methods and techniques for establishing guidelines for applications development.

The Tool Kit consists of DBMS' existing Standards, Procedures & Guidelines (SP&G) manual, a Standards Administration System Online that provides access to and maintenance of the standards in the SP&G manual and the Enforcer, a batch and on-line program checker for systems developers, the vendor said.

Price of the Quality Assurance Tool Kit is \$14,900. It will be available in the fourth quarter.

DBMS, 1801 Mill St., Naperville, Ill. 60540.

■ Micro Data Base Systems, Inc. has introduced Screen Maker, which allows applications developers to create end-user screen interfaces for Digital Equipment Corp.'s VAX-11/780 under DEC's Ultrix operating system, IBM's PC-DOS and Microsoft Corp.'s MS-DOS.

A spokesman said Screen Maker allows a user to create and revise screens interactively. Designs are maintained in a screen dictionary. Each screen can consist of a number of windows and frames. Individual help text can be added at each level.

Screen Maker is priced from \$2,500 to \$5,000.

Micro Data Base Systems, Suite 400, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

■ IMSL, Inc. has announced that its IMSL Library is now available for Hewlett-Packard Co. HP 9000 processors.

The IMSL Library contains more than 500 Fortran subroutines for a range of mathematical and statistical applications, a spokesman said.

The software is intended to reduce the time and expense involved in program development by enabling the programmer to select fully tested Fortran subroutines from the Library rather than writing them.

The IMSL Library is compatible with the HP 9000 Models 520, 530 and 540 running the Fortran 77 compiler under the HP-UX operating system.

IMSL Library is priced at \$1,200 for the initial year, renewable at \$1,000 a year.

Educational institutions are offered a reduced price, the vendor said.

IMSL Sales Division, NBC Building, 7500 Bellaire Blvd., Houston, Texas 77036.

■ Software Dynamics Corp. has announced an on-line version of Dynatune, its job control language (JCL) optimizer for IBM's OS/VS and MVS operating systems.

Dynatune On-Line now includes a dynamic reallocation feature that reads existing JCL and minimizes job requirements for disk space allocations and CPU cycles, according to the vendor.

The product costs \$5,800.

Software Dynamics, Suite 960, 1800 W. Loop South, Houston, Texas 77027.

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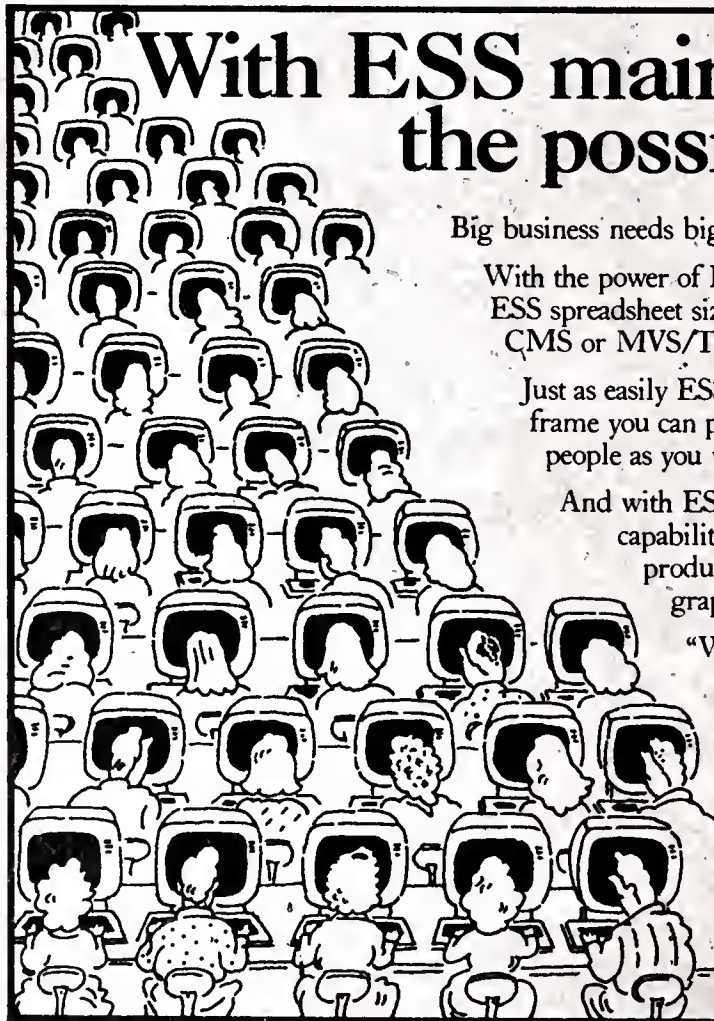
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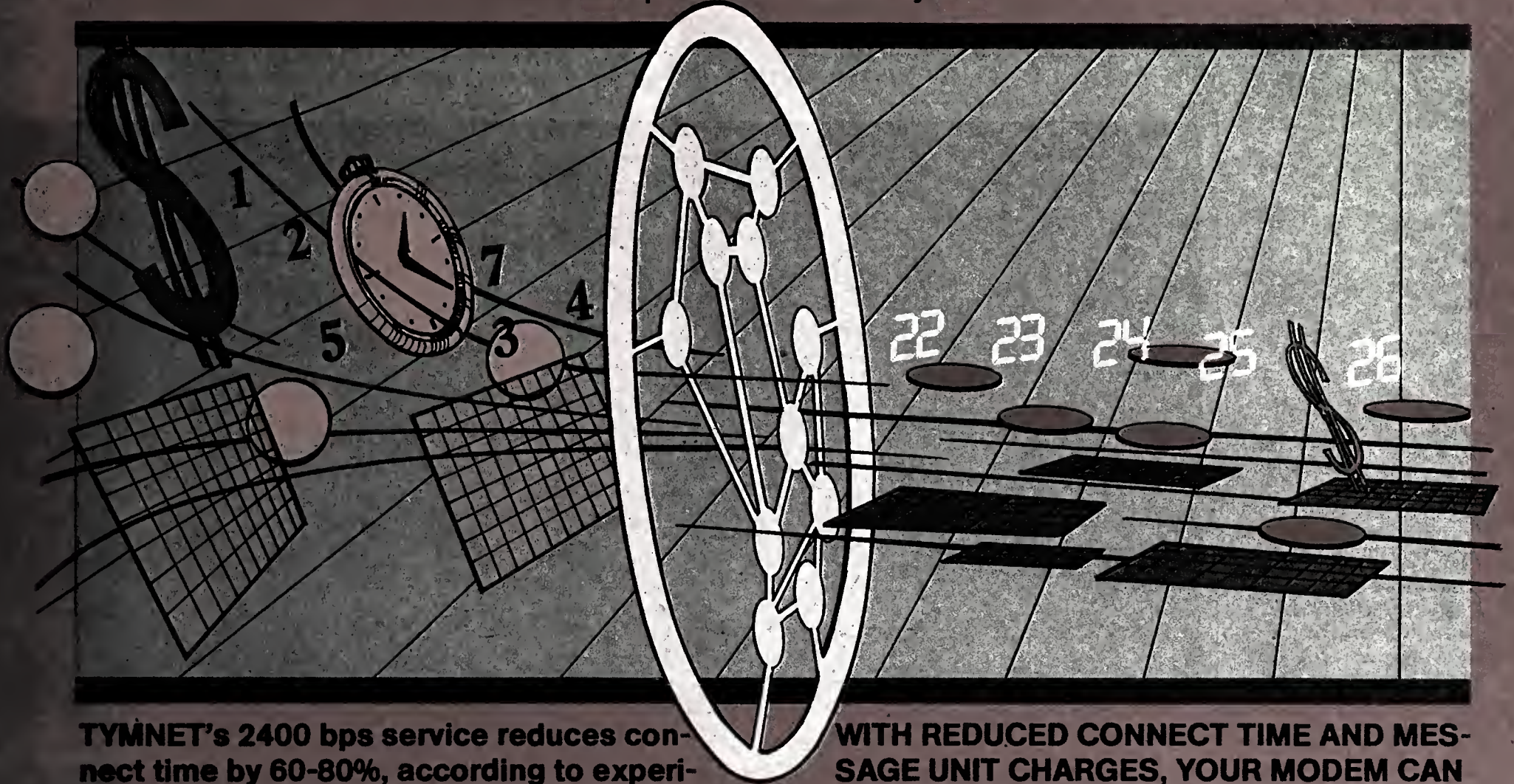
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SOFTWARE & SERVICES

APPLICATION PACKAGES

■ **Data Design Associates, Inc.** has announced Release 7.7 of its **Fixed Asset Accounting System** software, featuring incorporation of tax calculations that conform to the federal Deficit Reduction Act of 1984. Written in Cobol, the program runs in IBM DOS and MVS environments, on IBM's System/38 and on Hewlett-Packard Co. HP 3000 superminicomputers.

Other enhancements include an option for the independent close of corporate and tax books and automatic location lockup.

Data Design's asset type code is intended to increase the user's ability to make accurate projections regarding company assets.

Release 7.7 of Fixed Asset Accounting System costs \$30,000.

Data Design Associates, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086.

■ **Digital Equipment Corp.** has announced the availability of **Interleaf, Inc.'s** composite document processing software for the Vaxstation I and II workstations. The **Interleaf Workstation Publishing Software** runs under the MicroVMS operating system.

The Interleaf applications software enables users to prepare documents containing multiple typefaces and a range of graphics including data-driven business charts. Through a mouse-driven interface, users can access all editing and formatting resources necessary to produce original typeset documents.

The price for the Interleaf Workstation Publishing Software, scheduled for summer availability, is \$3,000.

DEC, 146 Main St., Maynard, Mass. 01754.

■ **AT&T Information Systems** has announced accounting software for AT&T 3B series computers and its Unix System V operating system.

AT&T Glows consists of five integrated modules. A write-up module automates the analysis and consolidation of general ledger accounts. An audit module includes capabilities for preparing lead sheets, work papers and financial statements for clients who maintain their own financial records. An After-The-Fact Payroll Accounting module can be used for preparing payroll data and federal W-2 forms.

Fixed Assets Reporting includes capabilities for calculating fixed-asset depreciation for up to 8,000 assets and the 1099 System helps with the analysis of company

records and end-of-year federal 1099 statements, a spokesman said. The product is priced at \$3,495.

AT&T Glows Practice Management (PM) includes modules for due data monitoring, staff-time scheduling, expense and work-in-process billing functions, fee collections and cost analysis. AT&T Glows PM is priced at \$2,495.

AT&T Glows and AT&T Glows PM together are priced at \$5,495.

AT&T Information Systems, 10 Southgate Pkwy., Morristown, N.J. 07960.

■ **Xerox Corp.** has announced the **Repetitive Manufacturing** module for its **Xerox Business Management System**, with features for reducing inventories and decreasing material flow time from vendor delivery to shipment of finished goods. The package runs in IBM SSX, DOS/VSE,

MVS and VM environments.

Repetitive Manufacturing is reportedly intended to eliminate work orders, increase the accuracy of work-in-process accounting balances and decrease paperwork. The application is directed at medium- to high-volume customers whose production is driven by daily or weekly production rates.

The product permits time-phased allocation of material by a work center in priority sequence, back-flushing of

work in process through one or more work centers, lot tracking and automatic consumption of components from line receipt to completion of the end item and use of delivery policies to schedule vendor deliveries efficiently.

Prices for the Repetitive Manufacturing module begin at \$75,000, according to the vendor.

Xerox Computer Services, 5310 Beethoven St., Los Angeles, Calif. 90066.



SOFTWARE & SERVICES

■ **Software International Corp.** has announced an enhanced version of its **General Ledger & Financial Reporting System**, which now supports **Wang Laboratories, Inc. Wang VS series minicomputers**.

Other enhancements to **General Ledger & Financial Reporting Release 5.2** include on-line screen painting capabilities, on-line editing of standard journal entries and rewritten documentation, a spokesman said. The system

can also be used with the global variables and return-code checking functions used in Wang's procedure language.

The product's on-line journal function, known as **Trace**, allows the user to develop exception displays and display transactions for only one employee. A **Hero** function is a mass maintenance facility that allows users to copy accounts within one entity or add an account in all entities.

Prices for the **General Ledger & Financial Reporting System** for the **Wang VS** range from \$18,000 to \$33,000.

Software International, 1 Tech Drive, Andover, Mass. 01810.

■ **Applied Data Research, Inc. (ADR)** has added a calendar and scheduling facility to **Release 2.0 of ADR/Email**, its electronic mail system for **IBM's DOS/VSE,**

OS/VS1 and OS/MVS environments.

ADR/Email 2.0 includes **Edate**, which allows users to schedule appointments and view other calendars. The function allows users to preschedule recurring or standard events, issue reminders of upcoming events and scan calendars for unscheduled time.

A permanent license for **ADR/Email**, including **Edate**, is \$45,000 for **OS/VS1** and **MVS environments** and

\$22,400 for **DOS/VSE systems.**

ADR, Rt. 206 & Orchard Road, Princeton, N.J. 08540.

■ **Precision Visuals, Inc.** has announced an enhanced version of its **GK-2000 graphics software tools for Digital Equipment Corp.'s VMS on the VAX superminicomputers and IBM's VM/CMS and MVS/TSO operating systems.**

GK-2000 Extended implements **Level 2B** of the evolving **Graphical Kernel System**, an international standard adopted by the **International Standards Organization**. The product includes features that allow the display picture to be repositioned, re-scaled, highlighted, combined, deleted and redrawn, a spokesman said.

GK-2000 reportedly allows users to configure segment storage and add floating-point coordinates for use with high-precision graphics devices. The graphics software also features extended error processing, on-line debugging, a pause function for examining images and file name control.

GK-2000 Extended is priced between \$6,500 and \$21,000.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

■ **Tektronix, Inc.** has announced **Tektronix Caddport for design documentation**. The product is said to link **Tektronix Plot 10 Computer-Aided Drafting Software, Teknicad**, with **PDA Engineering's Patran Solid Modeling and Analysis System**.

Teknicad runs on **Tektronix terminals and mainframes** and the **Digital Equipment Corp. VAX superminicomputers.**

Patran design information is carried to **Teknicad** via **Caddport**. **Patran** produces various product design views, and **Caddport** processes the views so they can be interpreted and manipulated by **Teknicad** to produce the design documentation, the vendor said.

Caddport license fees start at \$2,010; **Teknicad** license fees start at \$2,200; and **Patran** license fees start at \$8,000.

Tektronix, P.O. Box 1700, Beaverton, Ore. 97075.

■ **Bakco Data, Inc.** has announced **Release 5.0 of its Warehouse Distribution and Financial Control Application Software for the Hewlett-Packard Co. HP 3000 minicomputer.**

According to a spokesman, the software consists of the following modules: order management, accounts receivable, inventory manage-

Continued on page 54

YOUR TWO FAVORITE COMPUTERS NOW HAVE ONE THING IN COMMON. YOUR FAVORITE GRAPHICS TERMINAL.

Introducing the new CX4100 Series of Tektronix high performance, yet affordable color graphics terminals.

Now you can have the Tektronix **PLOT 10** graphics command set you've always wanted while you use the host of your choice, **IBM** or **DEC**. Just by typing a single

IBM-style keyboard. Plus **Tek enhancements**: individual key programmability, user-selectable ten-key pad, and joydisk for quick cursor movement and graphics input.

Screen output will be just as familiar as keyboard layout. **32-line 3278/3279 alphanumeric emulation** is built in. And so is full support for the **4957 Graphics Tablet**, plus full hard copy and transparency output to a full range of **Tektronix Color Graphics Copiers** and the **4510 Color Graphics Rasterizer**.

IBM flexibility is matched by DEC flexibility. In RS-232 mode, the terminals can run all VT100 applications through the extended ANSI X3.64 command set. In addition to the host interface port that transmits data at rates up to 38.4k baud, **CX terminals** are provided with two additional **RS-232 ports** and a **Centronics-style parallel port** for connecting a wide range of peripherals.

But best of all you'll have great graphics and full software compatibility. The **CX Series** will accept many existing programs written for **4010, 4100, and 4110 Series terminals**. And they're fully compatible with **PLOT 10 IGL, GKS, and TCS programs** as well as with popular third-party software such as **SAS/GRAPH®, ISSCO's DISSPLA®, and TELL-A-GRAF®** and **Precision Visuals' DI-3000®**.



Tek's all new precision ink jet 4692 color copier produces very high quality full color transparencies or hard copy.

That's software investment protection—matched by technology protection. **CX terminals** feature a **60 Hz non-interlaced display** with **4096 x 4096 addressability** displayed in a **640 x 480 matrix**.

16 colors, eight line styles, 11 marker types, rapid area fill, scalable/rotatable text, complete segment support, true zoom and pan, and separate dialog area. It's all there with the full **PLOT 10 command set**.

So don't wait. Set the best of three worlds on one desk: **TEK, DEC, and IBM**. Contact your local representative today for information on the **CX4100 Series**. Call **1-800-547-1512**. In Oregon **1-800-452-1877**.

Familiar **3270 IBM-style alphanumeric output** is fully emulated on all **CX4100 terminals**. Enhanced **IBM-style keyboard** is part of the package.

"switch-host" command.

Tek's CX4106, CX4107 and CX4109 are all directly plug compatible with both host environments. One coax to a standard **IBM 3270 controller** is all you need or one **RS-232 connection** to your **DEC system**.

To make your use of existing or new graphics data fast and friendly, the **CX Series** comes with an

Tektronix
COMMITTED TO EXCELLENCE

SOFTWARE & SERVICES

Continued from page 53

ment, warehouse locator, purchasing control, sales analysis/salesman commissions, accounts payable/cash management and general ledger/budgetary control.

The product's distribution module has been enhanced to generate more than 1,000 reports on demand, according to the vendor.

The inventory management module is said to provide the ability to maintain inventory status in 99 differ-

ent warehouses and includes the capability to issue inventory shortage reports and an interface with a purchasing control system to generate purchase orders.

A Lot Control subsystem enables the distribution application to set up individual lots with a termination date for each lot, the spokesman said.

The product's modules are priced from \$9,899 to \$22,700.

Bakco Data, Suite 190, 85

W. Algonquin Road, Arlington Heights, Ill. 60005.

■ **Sperry Corp.** has announced that P-Stat, Inc.'s P-Stat System, an interactive system that combines a data management facility with statistical capabilities, is now available for Sperry's Series 1100 mainframe systems.

According to a spokesman, P-Stat software offers statistical analysis, data display,

report writing and cross-tabulation capabilities. It features an on-line Help facility, interactive data entry, relational data base capabilities, a range of statistical commands and expandability through a user link facility.

A P-Stat lease for the Sperry 1100 is \$8,000 for the first year, and \$3,000 for each successive year, the vendor said. A permanent license for P-Stat on the Sperry 1100 is \$15,000 or \$5,000 for educational institutions.

Sperry, P.O. Box 500, Blue Bell, Pa. 19424.

■ **Data Processing Services, Inc.** has added serial number and lot number tracking features to its Distribution Processing System for the IBM System/38.

DPS/38 is written in RPG-III and includes order processing, accounts receivable, inventory control and purchasing and sales analysis modules, the vendor said. The product reportedly supports multicompany and multiwarehouse processing. Users can access a detailed history through inquiry commands.

DPS/38 can be integrated with the company's FIN/38 accounts payable package via user-defined tables.

DPS/38 costs \$47,000.

Data Processing Services, Suite 100, 11712 N. Michigan Road, Zionsville, Ind. 46077.

■ **Exeter Software Ltd.** has introduced an apparel distribution planning and control package for IBM System/38 minicomputers.

Warehouse Management System (WMS)/Apparel reportedly tracks merchandise at the stock-keeping unit levels and considers variable order-filling cycles and the apparel industry's preshipping procedures. An on-line query and reporting capability for stock locations is said to facilitate inventory control.

The product also includes capabilities for automatic auditing of inventory changes, the vendor said. WMS/Apparel reportedly can receive information on stock that has been put away and can generate shipping documentation.

The product is licensed for \$245,000.

Exeter Software, 160 Turnpike Road, Chelmsford, Mass. 01824.

■ **MCBA, Inc.** has announced a product routing package for manufacturers with a Wang Laboratories, Inc. VS series minicomputer.

Standard Product Routing (SPR) controls the sequence of operations, tool and assembly instructions for product manufacturing, a spokesman said. The software reportedly permits interactive entry and editing of routing data and maintains labor and machine hour standards at the operations level.

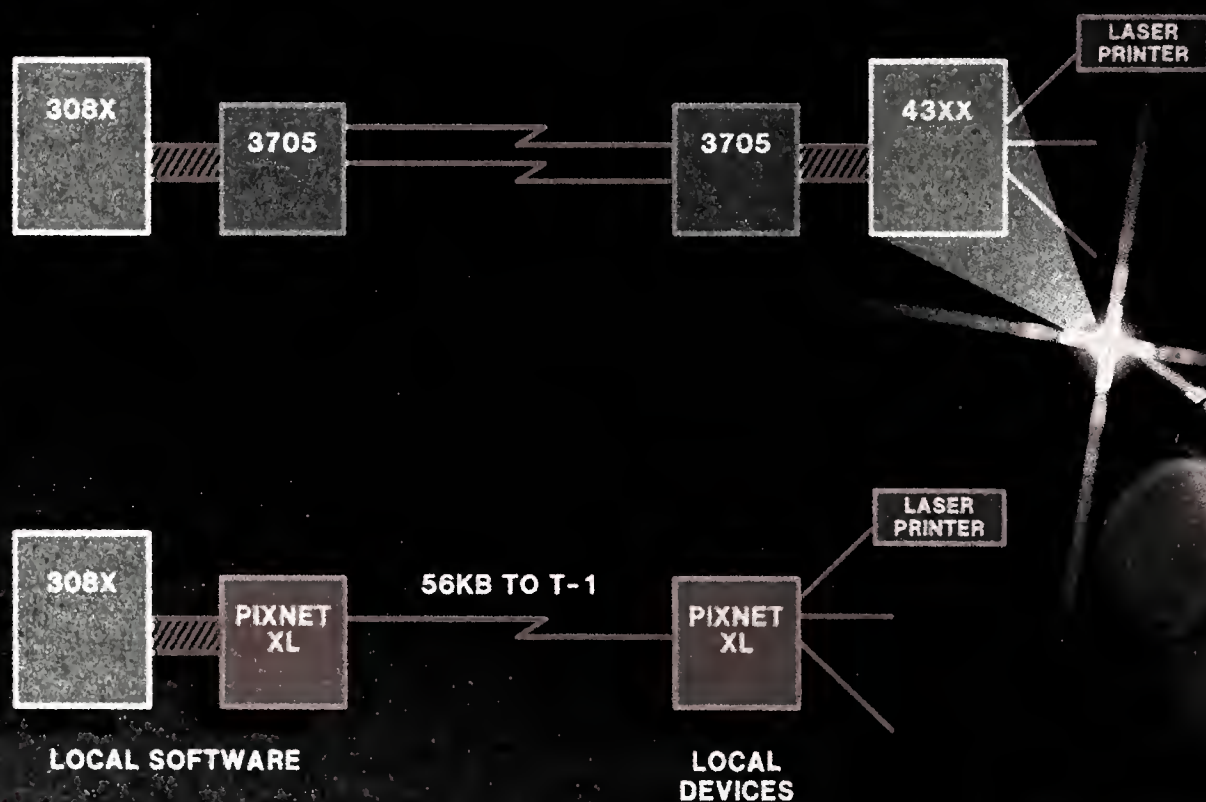
SPR allows users to create new routings by copying portions of existing ones. It provides alternate routings and supports a variety of operation types.

SPR is priced from \$2,500 to \$3,500, depending on configuration.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

See AIDS page 56

REMOTE CPU POWER WITHOUT THE CPU.



PIXNET-XL connects remotely located high-speed devices to IBM mainframes without extra CPU hardware or software.

Run 3800 laser printers and hundreds of CRTs at speeds up to 1.544 Mbps. Throughput goes up, hardware and software costs go down. That's economy.

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Our Series 1100 mainframes run the UNIX system.

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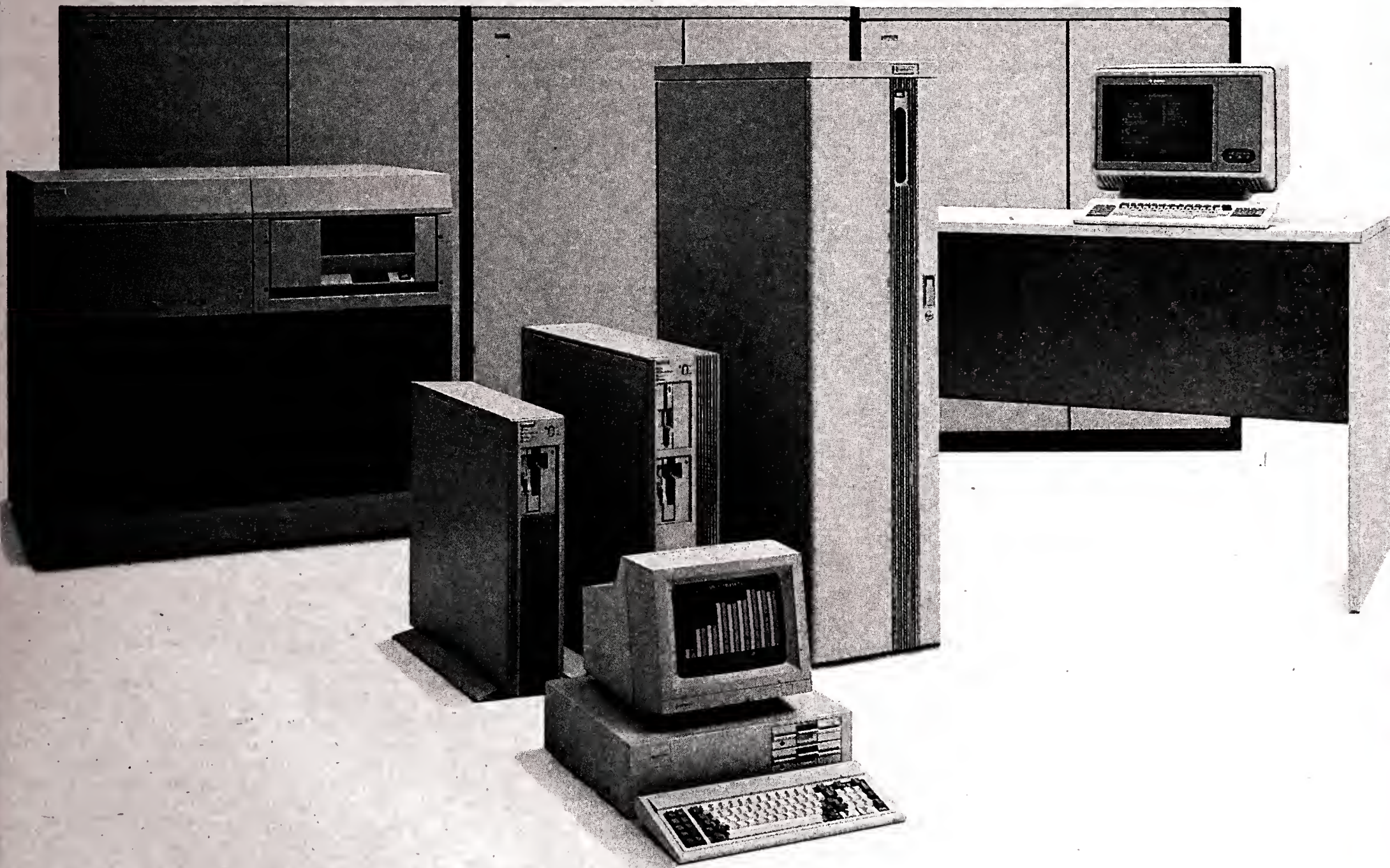
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more is to get a copy of our Sperry Information kit. For yours, or to arrange a demonstration at one of our Productivity Centers, call **1-800-547-8362.**

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Introducing an idea that makes obsolescence obsolete.



The UNIX* operating system from PC to mainframe.

SOFTWARE & SERVICES

AIDS from page 54

■ **Digital Equipment Corp.** has introduced an enhanced version of its integrated spreadsheet program for its VAX and Microvax computers.

VAX Decalc Version 2.1 enhancements include financial, statistical, logical and trigonometric functions. The product supports DEC's VT100 and VT200 series terminals and integrates with DEC's Datatrieve data base management program, Decgraph graphics capabilities, electronic mail and network support for information acquisition and distribution.

VAX Decalc Version 2.1 financial functions include capabilities for determining discounted payback.

Prices for VAX Decalc Version 2.1 begin at \$680.

DEC, Box 1003, 2 Iron Way, Marlboro, Mass. 01752.

■ **EEC Systems, Inc.** has announced four software products for users of Digital Equipment Corp. minis.

RJ-11 Cobol is said to be a Cobol compiler for the DEC RSX-11M operating system running on DEC PDP-11 minis. The RSX-11M version is priced at \$4,000.

EEC Systems' VRT reportedly allows the user to run RT-11 software under the VMS operating system on DEC VAX-11 series machines. RT-11 programs running under VRT are said to have direct access to files in VMS directories. VRT is priced at \$1,000 for a single CPU.

Filetab-D is a programming language and applications development program for the PDP-11 and VAX series. The product uses decision tables for debugging, program maintenance and documentation, according to the vendor. Filetab-D is priced between

\$1,000 and \$7,500, depending on the operating system.

EEC also announced Greek Math capability enhancement of its LEX-11 word processing software for DEC computers using VT220 terminals. The enhancement is said to support all major printers and character sets and is available for \$75.

EEC Systems, 327/E Boston Post Road, Sudbury, Mass. 01776.

■ **Integrated Planning, Inc.** has announced an enhanced version of its decision support system for IBM mainframes running VM/CMS or MVS/TSO, Digital Equipment Corp.'s VAX series and Prime Computer, Inc. systems.

Stratagem 4.7 combines a data base management system with modeling and reporting tools. It is an inte-

grated planning environment that features capabilities for financial modeling, statistics, graphics and an applications development language.

Enhancements include an improved report generator and an on-line Help facility. Also added were functions that compute running totals of values in an array and that return the midpoint of the functions stored in an array and allow users to restrict the operation to specific dimensions of the array.

Stratagem costs from \$25,000 to \$70,000 for minicomputer systems and \$85,000 for IBM mainframes.

Integrated Planning, 338 Newbury St., Boston, Mass. 02115.

■ **SDK Healthcare Information Systems** has introduced a nursing management system for computers that support Ansi-standard Mumps.

Components of the SDK Nursing Management System include Patient Acuity Classification, Nurse Staffing and Scheduling and Management Report Generation. Data can be entered directly at nursing stations or be collected on system-generated worksheets containing census and patient classification data. The system calculates acuties and reports staffing requirements by shift and station.

SDK Nursing Management System is priced from \$15,000 to \$40,000, depending on hardware configuration.

SDK Healthcare Information Systems, 1550 Soldiers Field Road, Boston, Mass. 02135.

■ **Oakland Management Services** has announced the Automotive Release Management System (Arms) for IBM's System/36 and 38.

A spokesman said Arms lets suppliers receive order release information from General Motors Corp., Ford Motor Co., Chrysler Corp. and American Motors Corp. Order release information can be transferred to the supplier's production scheduler. After the order is scheduled for production, advanced shipping notices are sent to the manufacturer.

Arms is priced at \$6,000 per module for the System/36 and \$8,000 per module for the System/38.

Oakland Management Services, P.O. Box 1019, 1754 Maplelawn, Troy, Mich. 48099.

■ **Digital Equipment Corp.** has announced Decjobmatch, an applications and job requisition package for DEC's VAX series of superminis.

Decjobmatch includes applicant tracking, job requisition entry and control, applicant resume entry and job searching capabilities. The software reportedly also offers an applications management function.

Decjobmatch can be interfaced with DEC's All-In-One and Data-trieve data base management system software.

The product price ranges from \$9,000 for the VAX-11/730 up to \$27,000 for the VAX-8600.

DEC, 146 Main St., Maynard, Mass. 01754.

■ **Megatek Corp.** has announced Contemplate, an engineering graphics package for use with Megatek's Template subroutine library.

The product allows engineers to design interactively graphs and

Continued on page 62

**[KEYFAST Online Data Entry System
from H&M]**

Monitoring data capture



KEYFAST, state-of-the-art online data capture from H&M, gives your end users control over all their data. Simply. From prompted format painting and edit check definition through data capture and offloading for further processing. This is made possible with optimum user guidance, menus, prompts, help screens (system-supplied and user-defined). Once created, formats are ready for immediate use (no CICS table entries required). Entry data can be checked or supplemented using the table features and multi-record and multi-format entry is possible on one screen. Automatic IF-THEN-ELSE logic.

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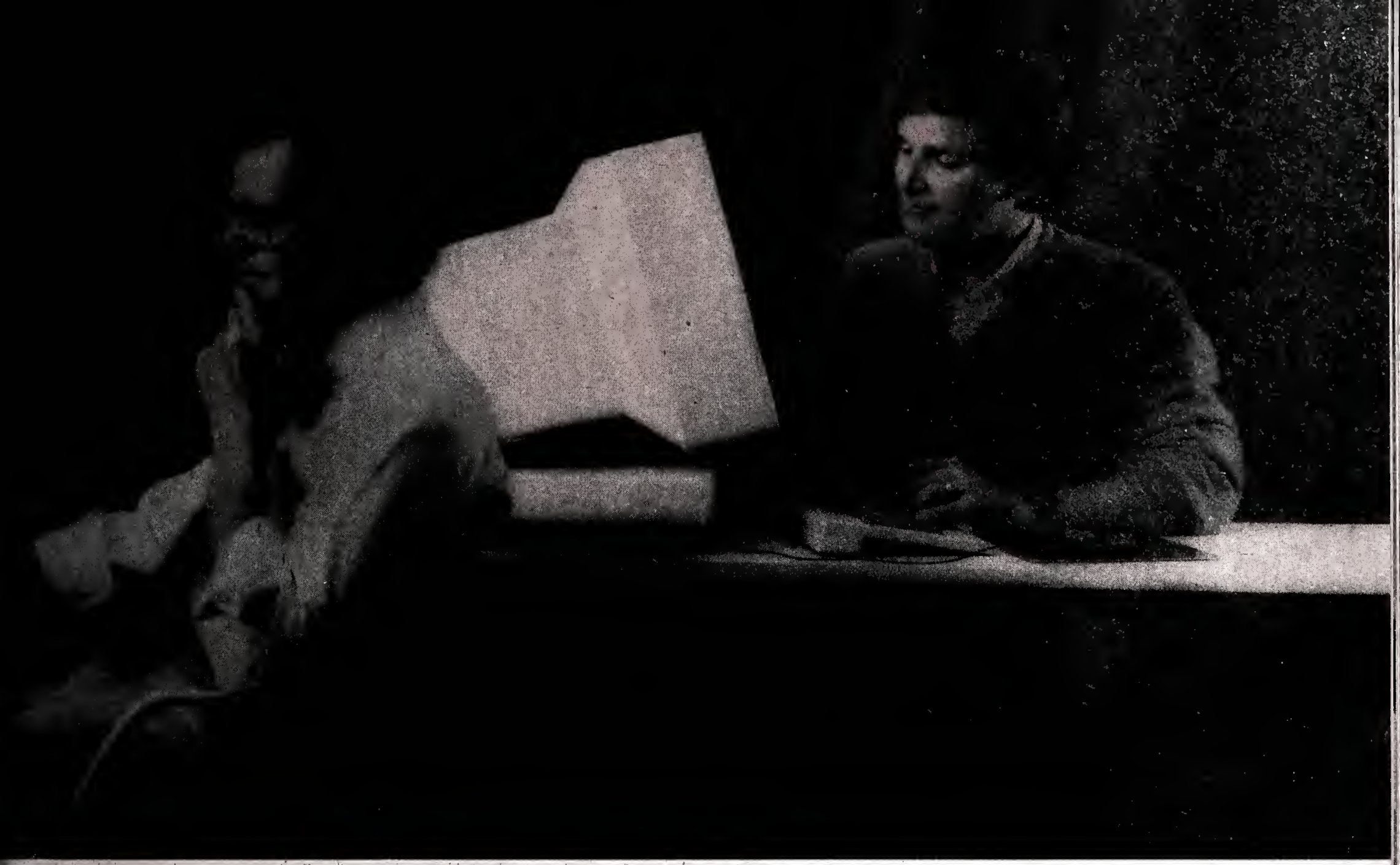
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Closed systems
are
the products of
closed minds.



Sun
workstations:
the open systems
from
open minds.



Sun Microsystems™ has declared open season on proprietary computer systems. And the closed minds that design them.

Sun's open attitude holds that no one should be dependent upon any one company to meet their every computing need. Because, at the speed technology is moving, any one who has to wait for their proprietary vendor to develop its own version of the latest breakthrough is going to get closed out. Period.

Full integration of proven industry standards gives Sun workstations performance equal to proprietary systems, without sacrificing compatibility. So, we give our customers the open opportunity to incorporate state-of-the-art products from a wide variety of vendors.

Sun workstations are designed to serve as the bedrock for a distributed information network. An open-ended network that overcomes the limitations previously imposed upon the users of proprietary systems: noncommunication

with existing computer investments, single-vendor delays in incorporating new technologies, high single-vendor prices, and all the other exciting advances closed minds have brought us.

Distributed Computing Network

Sun's family of workstations epitomize the new, open attitude of the computer industry, elegantly incorporating an open system architecture with the distributed power and speed necessary to create a complete development environment. A powerful Motorola 68010 CPU. A multi-tasking UNIX™ operating system. High speed Ethernet networking. Direct Virtual Memory Access and support of diskless operations. An advanced window system. Advanced programming tools. And more.

The free exchange of ideas is at the heart of any successful business endeavor. So, Sun created the Network File System (NFS). NFS allows members of your

engineering and software development groups to communicate with one another, with other computing resources (i.e. mass storage devices, supercomputers, etc.), and with a variety of computers already in use in other departments.

With NFS, the left side of your corporate brain will always know what the right side is doing. And the brain trust that results can really move a project along.

Open Market Options

But compatibility between Sun workstations and your existing computer investment is just the beginning. Today, a multitude of third-party companies in the "open" market are developing and aggressively marketing software, peripherals and add-on equipment for Sun workstations. CAD/CAM/Computer-aided-just-about-anything. Electronic publishing. Languages for artificial intelligence. Programming tools. And many, many more technical and general business applications.

Sun workstations have earned a reputation among third-party vendors as the open door to the UNIX market. Consequently, the number and diversity of products for Sun systems grows daily. Spurred by this competitive atmosphere, open market companies provide Sun customers with the latest technology, fast. At highly competitive prices.

If you like the sound of what you're reading, you're not alone. Many Fortune 1,000 companies, the U.S. Government, and over 100 top universities are already on Sun's client list.

And, in a pleasant juxtaposition of business realities, the best cost less. Sun workstations can cost substantially less than comparably equipped closed systems.


It's an open and shut case. You can either try to explain to your board of directors why you've put all their corporate eggs into one, proprietary basket. Or, you can look them square in the eye and tell them it's time they developed a more open attitude.



Sun-2/50
Desktop SunStation™

Sun-2/160
Color SunStation

Sun
workstations:
open architecture,
open network,
open options.



Sun-2/50
Desktop SunStation

Sun-2/120
DeskSide SunStation

Sun workstations are in the vanguard of the open rebellion against proprietary computer systems. And the closed minds that design them.

Sun Microsystems designed its full line of general purpose workstations around industry standards for hardware, software and data communications. And the unique combinations that resulted have created the nucleus for a distributed computing network: an open information network.

Just For Openers

Each Sun Workstation® gives its user a dedicated 32-bit CPU. Up to 8 megabytes of main memory. Integrated high-speed networking to allow sharing of information and peripherals across a network of Sun workstations or multi-vendor systems. High resolution graphics display. Advanced user interfaces, and more. Sun workstations work at the speed of thought, so your people spend less time waiting on the system. Less time getting projects completed, and products out the door.

The open attitude built into every Sun workstation begins with an advanced version of the industry-standard UNIX operating system, supporting demand-paged virtual address spaces, fast I/O to disk and local network, diskless operations and multiprocessing. Fast hardware combines with more than 220 UNIX utilities, three programming languages (C, Fortran, Pascal), SunCore™ graphics library, SunWindows™ plus additional tools, to create the most productive computing environment available today.

The Sun workstations' advanced Motorola 68010 microprocessor supports virtual memory of up to 16 megabytes per process. This allows users to develop applications larger than the amount of available main memory without complicated overlay schemes. And the Sun memory management unit allows the processor to access all of main memory with no "wait" states.

Sun Network File System

Perhaps most exemplary of Sun's total commitment to open system architecture is the Sun Network File System (NFS). NFS allows users to transparently access files across an information network of Sun workstations or a variety of multi-vendor machines. Via this network, teams of professionals can cooperate on project work, accessing any specialized computing resources they need.

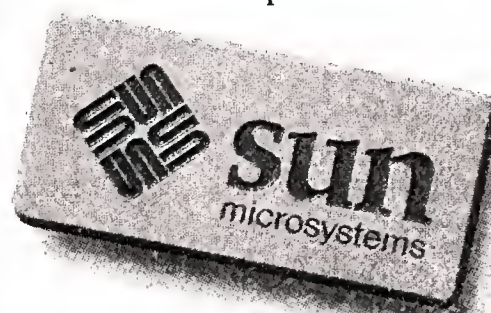
Since Sun NFS is independent of any particular hardware or operating system, it will evolve with developing network and computer technologies. And as part of our commitment to industry standardization, we're making our NFS an open book to interested parties in the hopes of filling the need for an efficient standard in this crucial area.

Sun's choice of industry-standard, 10 megabit-per-second Ethernet greatly simplifies the task of building Sun workstation or multi-vendor networking environments. Sun workstations

also implement standard TCP/IP protocols and support both Multibus® (IEEE-796) and VME backplanes with up to fifteen slots.

Open architecture means open options. Sun workstations give you a long list of powerful standard features and options, built around proven industry standards. *Plus*, an abundance of third-party hardware and software companies working to open new doors for you and your company.

To find out more about Sun's open attitude and the workstations that have evolved from it, write: Sun Microsystems, Inc., 2550 Garcia Avenue, Mountain View, CA 94043. Or, simply call (800) 821-4643. In California (800) 821-4642. Our lines are open.



**Open Systems
for Open Minds.**

SOFTWARE & SERVICES

Continued from page 56

charts using logical graphics input devices. Users can design charts with several axis options. It can perform algebraic calculations for data analysis or manipulation.

Contemplate is priced from \$3,700 to \$27,000, depending on configuration.

Megatech, 9645 Scranton Road, San Diego, Calif. 92121.

■ Honeywell, Inc. has an-

nounced that Execucom Systems Corp.'s Interactive Financial Planning System (IFPS) is now available on Honeywell's DPS 8, DPS 88 and DPS 90 mainframes running Gcos 8.

The IFPS is a decision support system and modeling package that uses a set of built-in routines for frequently used computations. The product includes functions for testing hypotheses. A report writer produces ad hoc and formal reports from

models and existing files.

IFPS is priced from \$40,000 to \$69,000.

Honeywell, P.O. Box 8000/A-79, Phoenix, Ariz. 85066.

■ The Bridge, Inc. has introduced an enhanced version of its Trak project management software for IBM mainframes running DOS/VSE or OS/MVS.

Trak 2.3 includes functions for on-line employee

work load forecasting, project scanning, as well as improved data access security, and enhanced project-level Gantt charts, the vendor said.

Trak 2.3 costs \$9,900.

The Bridge, 199 California Drive, Milbrae, Calif. 94030.

■ Software Express has introduced accounting software for several versions of the AT&T Unix operating

systems, Pick Systems' Pick operating system and Microsoft Corp.'s Xenix operating system.

Accountant's Client Write-Up provides users with audit tracking and report-generation capabilities, the vendor said. It is compatible with other Software Express accounting packages.

The product costs \$3,500.

Software Express, 2925 Briarpark Drive, Houston, Texas. 77042.

■ Jonas & Erickson Software Technology, Inc. has announced a Contractor Estimating System for the MAI Basic Four, Inc. 2000 and 8000 series minis.

The Contractor Estimating System performs cost calculations, estimate summaries and estimate analyses. The package is integrated with the company's other construction industry software, including job costing and scheduling, equipment costing and analysis, bidding, fixed-asset control and trucker billing.

The Contractor Estimating System costs from \$2,000 to \$6,500 depending on the hardware chosen.

Jonas & Erickson Software, Suite 700, 235 Yorkland Blvd., Willowdale, Ont., Canada M2J 4Y8.

■ Fusion Products International has announced Version 3.0 of Fusion/4 Information Retrieval, its fourth-generation report writer for the IBM System/38.

Version 3.0 boasts performance improvements of roughly 150% over Version 2.0. Security features have been simplified, support for a multiple data dictionary has been added, Help text has been expanded and documentation has also been improved.

Reports created by users may be executed immediately or compiled into machine language for better performance, an option which now appears on the Fusion menu. The report is compiled automatically when its identifying number is entered at a prompt. An added Data Base Administrator feature decides which reports will be processed interpretively and which will be compiled.

Fusion/4 Version 3.0 is available in English, German, French and Kanji (Japanese) language versions. A single-copy license is \$7,000.

Fusion Products International, 900 Larkspur L.C., Larkspur, Calif. 94939.

■ Keane, Inc. has introduced a hospital information system for the IBM System/36.

Hospital Information System/36 (HIS/36) consists of a

Continued on page 66

BABY/34
BABY/36

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Current Issues—Print Only

- ☐ Large Mainframe Update: The Used 3080 Market
How to take advantage of lower cost, used 3080's until
IBM's new 3090's are delivered.
- ☐ XA Migration: The Hardware Solution
The "path of least resistance" . . . but is it for you?
- ☐ The DASD Market: 3350's versus 3380's
New technology is not a good enough reason for
choosing 3380's. A combination of 3350/3380 may
work best!
- ☐ Core Recovery: The Prelude To A Disaster
Recovery Program
The sensible way to get a Disaster Recovery Program
in motion.
- ☐ Customer Visits/Videotape Program
What they are . . . and how to take advantage of them.

- ☐ PCs—Controlling the Impending Explosion
As with mainframes and peripherals, leasing PCs on short
terms from Comdisco makes sense.

Future Issues

- ☐ The Real Impact of Sierra/3090
What is IBM's long-range CPU game plan? How the
customer can make IBM's strategy work for him, too.
- ☐ Dual Density 3380's
Do you need them? What is the real price performance?
What are the long-term implications?
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See how Comdisco can duplicate your data center—a total
service offered by no one else in the industry.

Name _____		Title _____	
Company _____		Phone _____	
Street _____	City _____	State _____	Zip _____
			CPU's Installed _____

Mail to: Comdisco, Inc., 6400 Shafer Court, Rosemont, IL 60018 312/698-3000

CW

The carrier on the right is the Telecopier 295, a new high-speed facsimile just introduced by Xerox.

While it's not quite as flashy as the Concorde on the left, the technology is just as amazing.

Imagine a small, desktop

digital facsimile that can transmit high resolution copies of your documents anywhere in the world in little more than the time it takes to fasten your seat belt.

But the Telecopier 295 is not only quick, it's less expensive to

operate (with facsimile, faster is cheaper) and perfect for medium to high volume operations.

It's compatible with just about everything: the Xerox Telecopier family, most other facsimile terminals, and with the personal computer world as well, including

New York to Paris. 3 hours, 45 minutes.



the computers and workstations that are part of Team Xerox.

With the G1/G2 analog compatibility option, it can communicate with other slower speed facsimile terminals. With the RS-232-C

option, it can also convert and print ASCII encoded information from a vast array of computers.

But the most amazing thing about the Telecopier 295 is its price: about the cost of one round

trip to Paris on the Concorde.

Now that's progress.

To learn more about the

Telecopier 295, call 1-800-833-2323, ext. 44, or

send your business card to

Xerox Corporation, Dept. 44013,
P.O. Box 24, Rochester, N.Y. 14692.



New York to Paris. 25 seconds.



SOFTWARE & SERVICES

Continued from page 62

patient registration, billing and receivable module; a communications and results reporting module; and a medical records module. Each module can be purchased separately, the vendor said.

Other software programs developed and marketed by Keane, including general ledger and budgeting, payroll and personnel applications, can be integrated with the HIS/36.

HIS/36 is priced at \$43,000.

Keane, 420 Bedford St., Lexington, Mass. 02173.

■ **Mobius Management Systems, Inc.** has announced Release 3.0 of **Infopac — The Output Management System**, which provides for automatic distribution of computer-generated reports. The package runs in

IBM DOS and MVS environments under CICS.

Release 3.0 features on-line report viewing and on-line definition of report distribution parameters to any output device. The on-line viewing system enables end users to go directly to the report, version and page they wish to view. Users can also choose the desired report or version from a system-maintained menu of stored reports. Users can perform character-string searches or can browse through the report. Both 80-char. and 132-char. screens are supported.

With the on-line viewing modules, users can selectively print part or all of a report. Printed output can be routed by the user locally to CICS printers, remotely to remote job output printers or centrally to high-speed impact or laser printers.

Prices for Release 3.0 of **Infopac** start at \$12,500 for DOS and \$22,500 for MVS.

Mobius Management Systems, 271 North Ave., New Rochelle, N.Y. 10801.

■ **Software Design Associates, Inc.** has announced a management information system for financial institutions with the **IBM 4300 series mainframes running MVS.**

The **Risk Asset Management System (Rams)** works in conjunction with **Cullinet Software, Inc.'s IDMS data base management system.** Rams can generate regulatory reports, reports on global customer and credit relationships, and it includes capabilities for monitoring adherence to credit policies. Rams extracts information from existing systems to

build an integrated data base, a spokesman said.

Rams costs \$500,000.

Software Design Associates, 71 Fifth Ave., New York, N.Y. 10003.

■ **Polaris Systems, Inc.** has announced the **QDM+ package** for enhancing **Hewlett-Packard Co.'s QDM/1000 Quality Decision Management software.** Both packages run on **HP 1000 minicomputers with the RTE-A operating system.**

QDM/1000 is intended for use by manufacturing engineers to monitor and manage product quality. The **QDM/1000** system collects numeric and descriptive data from the manufacturing environments and formats it for use in management applications.

QDM+ enhances **QDM/1000** by allowing a system manager to use full screen forms, soft keys and edits for data entry without programming, a spokesman said. Existing paper forms can be duplicated on the display, along with user-specific data collection cycles featuring single- or multiple-display forms.

QDM+ costs \$12,880.

Polaris Systems, 2329 Highway N. 34, Manasquan, N.J. 08736.

■ **Datacamp Systems, Inc.** has added query and spreadsheet modules to its **Mirage utility system for IBM System/38 minicomputers.**

Execquery38 gives users the ability to create reports from up to five files, the vendor said. Users can change sorting criteria and subtotals and specify which columns of data to print without having to rerun the data base interface.

Execsheet38 provides spreadsheet floating-point decimal capabilities, formula replication capabilities and a data base interface. Users can create bar, line and pie charts in both color and monochrome. A cut-and-paste feature allows users to create multiple graphs in one display, the vendor said.

Execsheet38 is priced at \$3,495. **Execquery** costs \$2,495.

Datacamp Systems, Suite 1, 2283 Dunwoody Crossing, Atlanta, Ga. 30338.

■ **Burroughs Corp.** has announced the **Burroughs Advanced Manufacturing Control System (BAMCS)** for its **B5000, B6000, B7000 and A series mainframes.**

BAMCS consists of five modules. The **Business Foundation** module lets users store, maintain, retrieve and utilize manufacturing data. The **Business Planning, Scheduling and Shop Floor Control** module lets users create production and purchasing schedules. The **Customer Management** module lets users record, manage and fill customer orders.

The **Purchasing Management** module provides capabilities for scheduling manufacturing material requirements. It allows users to select suppliers, manage purchase orders and keep track of inspected and purchased materials, the vendor said. The **Financial Management** module includes capabilities for tracking project costs.

BAMCS leases for \$1,125/mo or \$36,000 for a four-year license.

Burroughs, One Burroughs Place, Detroit, Mich. 48232.

See AIDS page 69

There are several ways to simplify VM for your users... and they're all called **MULTIPAK/VM™**

MULTIPAK/VM is a productivity aid designed by **SKK, Inc.** to enable your VM users to more easily perform daily tasks. **MULTIPAK/VM** is actually a collection of four separate but related VM utilities that improve upon some existing facilities, while adding some powerful new capabilities for VM users under CMS.

MULTIPAK/VM was written to assist users at all levels of experience. The package offers a trove of features that will benefit the most experienced VM/CMS programmer as well as the non-technical, inexperienced VM user.

Here are just a few of the many ways that **MULTIPAK/VM** can help you:

1. SPOOL VIEWER

Spool Viewer gives users the ability to now display all spool files. This includes print and punch files, which were previously inaccessible. With **Spool Viewer** users are no longer limited by file size, because the entire spool file may be viewed regardless of size.

Spool Viewer offers user-tailorable screens, which may also be used to change the displayed data. The **Display/Change** feature enables users to change file attributes by simply keying-over the displayed data without using complex CMS commands.

2. SHORT CUT

Short Cut is a command shell which simplifies CMS by guiding users through a multilevel system of command panels. **Short Cut** is designed to reduce the CMS learning curve and to increase efficiency of experienced users by offering simpler, faster alternatives to existing facilities.

Managers may use **Short Cut** to restrict CMS command usage by specific groups of users or by individuals.

3. SCREEN PAINTER

Screen Painter enables users to construct full-screen application panels by laying out screens exactly as they are to appear. **Screen Painter** offers new levels of performance, while automatically validating all screens and allowing users to print screen hardcopies. These screens may be called from an assembler program, and **EXEC**, or a high-level language.

4. STRETCH EDIT

Stretch edit offers VM users new and enhanced **XEDIT** capabilities. **MVS** or **VS1** datasets, or parts thereof, may be copied directly into CMS files without losing the current line displayed. **Stretch Edit** allows users to swap screens, rename files in one step, and enhance normal program function key usage.

5. FREE TRIAL

SKK can also give you a productive way to evaluate **MULTIPAK/VM**; a 30-day free trial. Simply mail in the completed coupon or call a **MULTIPAK** marketing representative at 312/635-1040.

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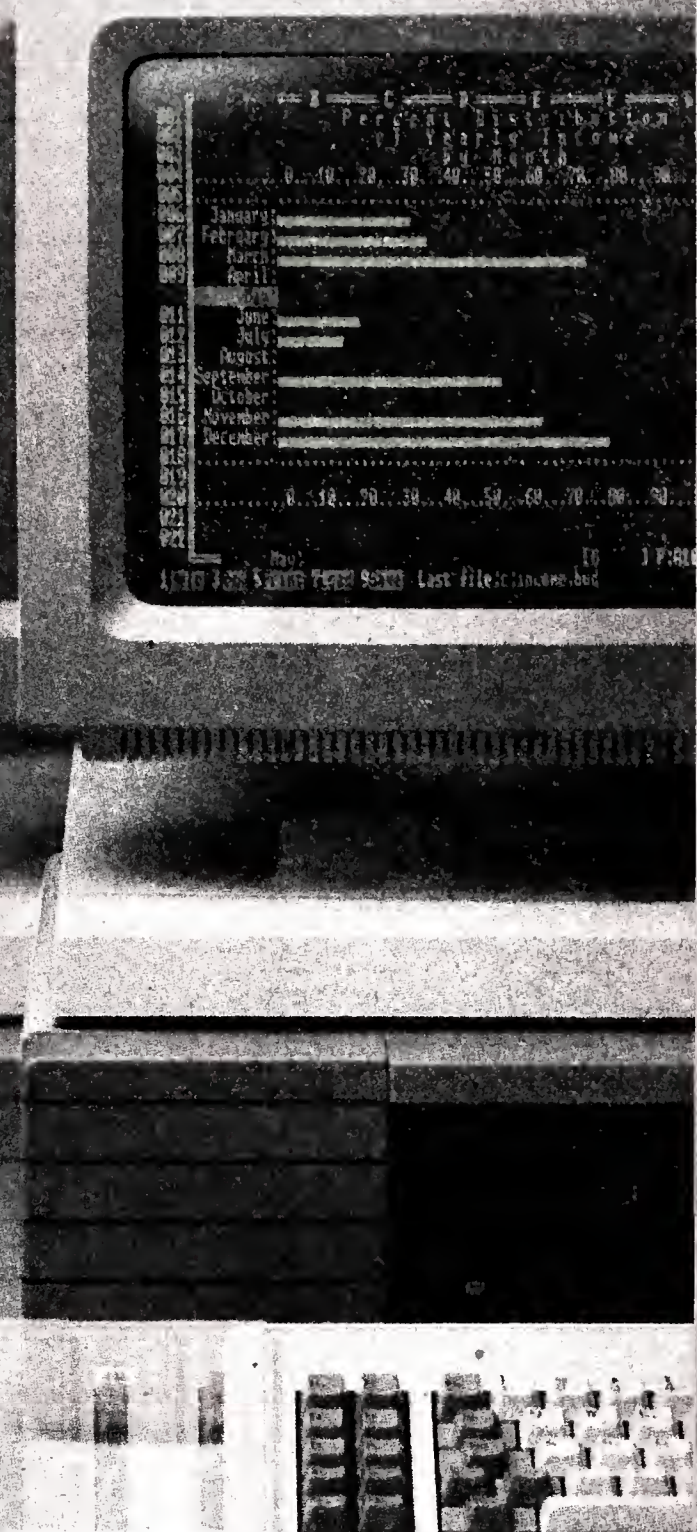
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SOFTWARE & SERVICES

INMON from page 47

other vendors voice the merits of the dual-data base strategy. Which side is right?

The controversy can be traced to the very origins of the data base itself. Consider the world of master files, where every new application breeds its own set of master files, which usually are redundant. The promise of the data base as a single system of record was made, and soon master files disappeared from the scene.

A single system of record is one in which the content of data resides in its up-to-the-second value at the most detailed level. With a single system of record, the difficulties of master file redundancy and data synchronization are greatly minimized.

With a data base, which was touted as the be-all and end-all for users, there was no need for redundant data strewn all over the DP landscape. Thus, the early and intellectually appealing argument was made for the "truth" data base — the data base that served all data needs. Unquestionably, the truth data base approach was an appealing step in the right direction from the master file concept.

To this day, some data base management system vendors still make the claim that a single data base is the best approach.

But just as the world changed from master files to data bases, so has today's world changed from a single-data base concept to a multiple-use concept of data. The demands on today's data bases are many and varied — from the high-speed uses in bank teller and airline reservations data bases to the analytical needs of a vice-president of planning for decision support processing.

Evolution to dual data base

The next evolution from the truth data base approach is the dual-data base scenario. The primary division of data base processing is made along the lines of on-line, or operational, data bases, and decision support data bases.

On-line environments typically require a very structured kind of processing, while the uses of decision support data bases are unstructured. To use hardware to its fullest advantage requires the separation of structured and unstructured activities onto different processors.

Systems programmers have long known that IBM's CICS should not be mixed with TSO. Today's data base administrators are making a similar discovery. Cullinet Software, Inc.'s IDMS does not belong on the same machine as Information Builders, Inc.'s Focus.

To even the most die-hard relational advocate, it is ap-

parent that the purpose and uses of decision support data are very different from those of operational data. Thus, the division into a dual-data base environment is a natural progression.

This assumes that there remains a single system of record, which nearly always is in the operational environment. Were there to be multiple systems of record, the advantage of going to data base from master files would be lost. But the dual-data

base approach in no way mandates that there be multiple systems of record.

For decision support processing, there simply is no need to have up-to-the-second currentness of data or the level of detail found in the system of record. Thus it is that the dual-data base scenario represents the next step up in evolution.

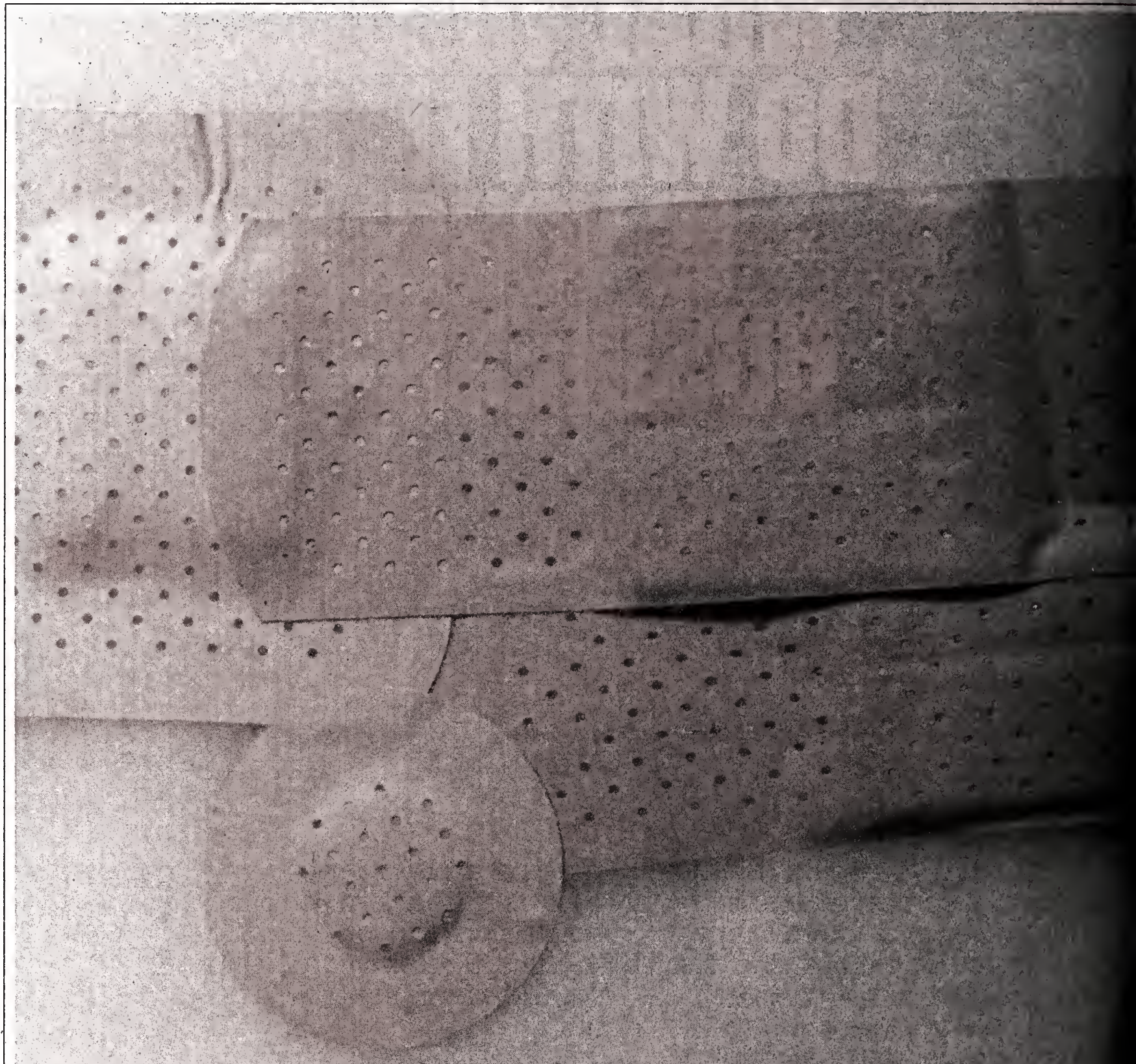
The world is evolving into not only a physical separation of processors but also a physical separation of types

of processors. For example, on-line operational systems are not just being physically separated from decision support systems, but operational systems are dominating the world of mainframes, and decision support systems are rapidly migrating to the micro environment.

An interesting issue is whether IBM has embarked on the dual-data base philosophy by accident or by design. Certainly, with DB2 and IMS Fast Path, IBM is

clearly advocating the dual-data base approach. Cynics have suggested that IBM embarked upon that approach merely to protect its many customers that have billions of dollars of applications code tied to IMS.

While it is possible that IBM chose the path of expediency, in this case IBM has chosen the proper next step of evolution. Clearly, the next evolutionary step for the data base is the dual data base.



IT'S TIME TO STOP PUTTING BAND

Without doubt, the proliferation of personal computers throughout your organization has done much to increase personal productivity within departments.

But it has also given rise to an increasing — and alarming — decentralization of information, much of which is vital to the whole organization.

The answer, of course, is networking — tying together groups of

PCs on a system that allows them to communicate with others.

Unfortunately, however, most currently available networking solutions address only part of the problem. Sure, they tie compatible PCs together within departments. But can they communicate with similar networks in other departments?

And where does that leave the information needs of the company as a whole? What about communications between non-

compatible PCs, LANs, host mini-computers and mainframes?

What is really needed is a solution that addresses all of your networking problems. A solution like Banyan's Virtual Networking System.

Unlike LANs and other partial solutions to the problem, Banyan approaches networking from the standpoint of distributed computing, where one or more LANs must be supported within departments, between departments, between buildings or even in other cities.

SOFTWARE & SERVICES

AIDS from page 66

■ **Learned-Mahn, Inc.** has announced the **Automated Clearing House (ACH) Interface** for automating contract disbursements in banking applications. The package runs with the company's **Contract Collection Manager** on the **IBM Personal Computer** family.

The ACH Interface is used to replace deposit tickets and cashier's checks, a spokesman said. The master record

of the **Contract Collection Manager**, which automates third-party contract collection and disbursement services, contains disbursement instructions.

Using the ACH features, disbursements reportedly are written to an ACH file instead of writing a cashier's check and deposit tickets. The file is prepared in National ACH format, the standard for paperless transactions.

Licenses for the ACH In-

terface are priced at \$4,000.

Learned-Mahn, 2229 W. State St., Boise, Idaho 83701.

■ **Tasvir Corp.** has announced a **bidirectional utility program** that transfers data between **Computervision Corp.'s Cadd** system and **Tasvir's Supercads** computer-aided design systems.

Superlink transfers models to Supercads where the model may be edited and sent back to the Computervision

system while retaining the model's data structure, a spokesman said. Supercads is written in C language and gives users three-dimensional mechanical CAD capabilities. Supercads runs on Digital Equipment Corp.'s VAX systems, Apollo Computer, Inc.'s Domain workstation and the IBM Personal Computer AT.

Superlink sells for \$3,000.

Tasvir, 2490 Charleston Road, Mountain View, Calif. 94043.

DSS from page 47

age must be brought up quickly or users will lose interest in the fledgling system and revert to their old ways of making decisions, Wark said.

When selecting the capabilities needed in the DSS, managers should determine what it is they want to do most, Wark said. More importantly, he emphasized, they should be wary of vendor claims.

"Vendors are going to try to get you to look at what is interesting to them." If your budget permits, consider adding advanced data presentation facilities, Wark said. "You'll use more of those facilities than you will some of the sophisticated statistic modeling capabilities," he said.

Selection criteria

As when choosing an applications package, management must first develop selection criteria based on required capabilities and then conduct a preliminary evaluation of DSS products, narrowing the candidates to about four products, Wark recommended.

Once the list has been culled, Wark advised MIS management to learn more about the DSS products either through seminars or discussions with users.

Bench mark studies are not always the best approach for comparing products, Wark cautioned. "There is not a good vendor anywhere that does not know how to skew a bench mark."

As an option, companies should consider using products for a trial period. Wark suggested that companies convince the vendor they need a trial period.

Ease of use is one of the most important aspects of DSS, according to Wark. Users must be able to express their problems easily to the machine, and the most natural way of expressing those problems can vary from user to user. "For instance, APL [might] be a natural tool for an engineer to express a problem," he said.

Intelligent editors, query-by-example facilities and a language that allows users to take advantage of a relational data base management system are some of the capabilities that might help users present their problems, he said.

But success of the DSS implementation does not rely only on technology, according to Wark. The political environment at the company can be even more crucial to acceptance than trying to justify a product's price, he said. Managers must get user support first, he noted. "You have to have all your ducks in a row. If you don't line up your support ahead of time, all this is a wasted effort."

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In effect, Banyan offers a low-cost method of standardizing workstation communications at the department level, while allowing each department to install the LAN solution that best meets its requirements.

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MIS plans by providing a communications environment which is compatible with the information sharing needs of the entire company.

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SOFTWARE & SERVICES

INTERVIEW from page 47

people who've written 10,000 or 100,000 lines of code in a particular [fourth-generation language]. There are lots of problems with the so-called [fourth-generation languages]. None were developed according to modern ideas of language design. They all have GOTO [commands] and strange labels and archaic control structures.

Secondly, there are too many of them. With a standard language like Cobol, there is a whole market of tools available. If you want to compare two source code files or draw a picture of the control structure of the Cobol program, there are tools to do that. But if you have 100,000 lines of some [fourth-generation language] and you go out to find something to draw a picture of its control struc-

ture, you're likely to draw a blank. The vendor may not have gotten around to it, and it's not big enough for anyone else to get around to it.

This is a good argument for sticking to the language that has the most users. All surveys show Cobol holding its own. I would say more than half of all the code in the universe is Cobol.

I wrote a story on [fourth-generation language] cannibalism. They're [fourth-generation language vendors] buying each other up, and some are really hurting. There are too many out there. I hear stories in New York of companies trapped into hiring [fourth-generation language] consultants when they have substantial applications running in [fourth-generation language]. Modifying and keeping those applications running is a specialized task.

Q What are the maintenance implications of prototyping?

Prototyping is a buzzword that nobody has really thought through. Really, what you're saying in prototyping is that you're going to develop something very fast and then modify and adapt it. The implication of that is you get into maintenance a lot faster than you do with conventional development. The more prototyping you do, the better [you] know about maintenance because that's where you're going to be after day one.

Q Should maintenance programmers be paid more as a reflection of their real value within a DP shop?

It's up to the maintenance people to fight, not necessarily for more pay but [for] more responsibility. If a maintenance group is paying a com-

pany's bills much more than a rival development group [is, it] should state that case to management. Nobody [else] is going to do it.

Software is not going to go away. If we don't learn to control and modify it, it's out of our control. Our society is dependent on software. Our hope is to support people who are now doing or trying to do software maintenance.

Q Are most computer science graduates interested in development rather than maintenance?

Education in any technology always lags behind the real world. Since there were, at last count, only four college courses in software maintenance in the entire U.S., it's very unlikely that anyone is going to come out of college knowing about maintenance. You have to learn it on the job.

Q Why are so few courses offered?

I think it's because professors don't have to deal with large systems that already exist.

The average textbook is about how to write a little routine to do sorting. Every semester the professor sees 35 more students write yet another sorting routine.

Q Why aren't programmers interested in maintenance?

It's hard to go into a job and find it [to be] something you never heard of in your education. A demotivating factor is that many shops still approach maintenance with a philosophy and technology that are not adequate.

Maintenance has been regarded as something people do in three-day or one-week projects, more or less without tools. But some modification tasks are between the quick fix and the 50-person-year development project. Most organizations have no place to put projects like that.

Q Are vendors guilty of overemphasizing products for development rather than maintenance?

There is an elite group of vendors who understand maintenance, but vendors in general are hopelessly backward in this area. It's easier to write a tool that generates code according to some idea you have of how code ought to be generated.

There are probably 1,001 generators of fourth-generation languages. Every one is slightly different, and every one is a map of the brain of the company that produced it. It's easy to do that. What's difficult is to look at a system that exists and adapt yourself to it.

The vendors in the software maintenance environment tend to boast a whole lot less. . . . They don't try to sell you the total solution.

Q What's the state of the art in tools?

The state of the practice is that there are excellent tools for specific problems. There has been a lot of talk about putting the tools together in one consistent workbench. I'm skeptical about this. It's not clear that what's keeping people from using tools is not having the one workbench. Second, it's a lot harder to put these tools together than it appears. The interesting commercial opportunity I see is to combine 15 tools and put them together in a joint marketing effort: A tool bench of other people's tools.

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JOHN CULLINANE

On the Information Center Strategy

Today, virtually every IBM mainframe user is attempting to implement an information center. Formulating a successful information system strategy for the 80's and 90's requires it.

However, one of the major problems many companies face is the variety of software and databases located on different mainframes, departmental minis and personal computers. The challenge is to create an environment that integrates this diversity, is

"Open system architecture is key in implementing an information center strategy."

responsive to the corporate user community in meeting its information needs and, most importantly, provides access that is consistent and transparent. This is why open system architecture is key in implementing an information center strategy.

It also makes particular sense for a software company like Cullinet to adopt a policy of open system architecture that allows corporations to standardize on Cullinet's products without losing a significant investment in other vendors' products—whether they are mainframe applications, microcomputer software such as Lotus 1-2-3, Symphony and other PC products or departmental minis from companies like Digital, Data



General, Wang, Hewlett-Packard and others.

That's why Cullinet has introduced the Information Center Management System. It's one part of a strategy that makes it much easier for the VP of Information Systems to standardize on the full range of Cullinet software, including our proven mainframe data-

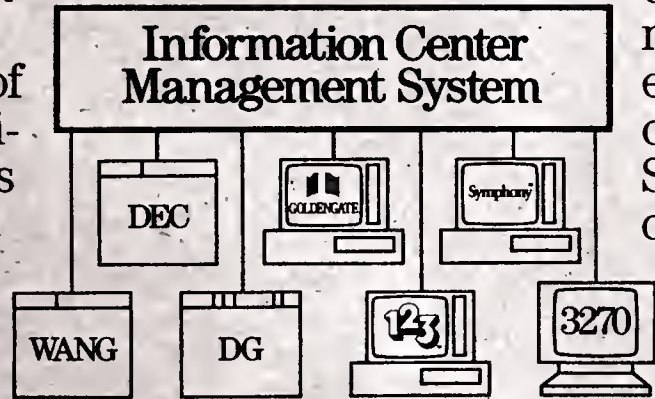
base and applications and our integrated GOLDENGATE microcomputer software.

Our strategy makes sense not only because Cullinet products are designed to work together, now and in the future; but also

because our open system architecture means that data processing management will be able to accommodate satisfied users of other software while anticipating the introduction of new products.

For more information about the Information Center Management System and the full range of Cullinet products, I encourage you to phone, toll-free, 1-800-225-9930. In Massachusetts, the number is 617-329-7700.

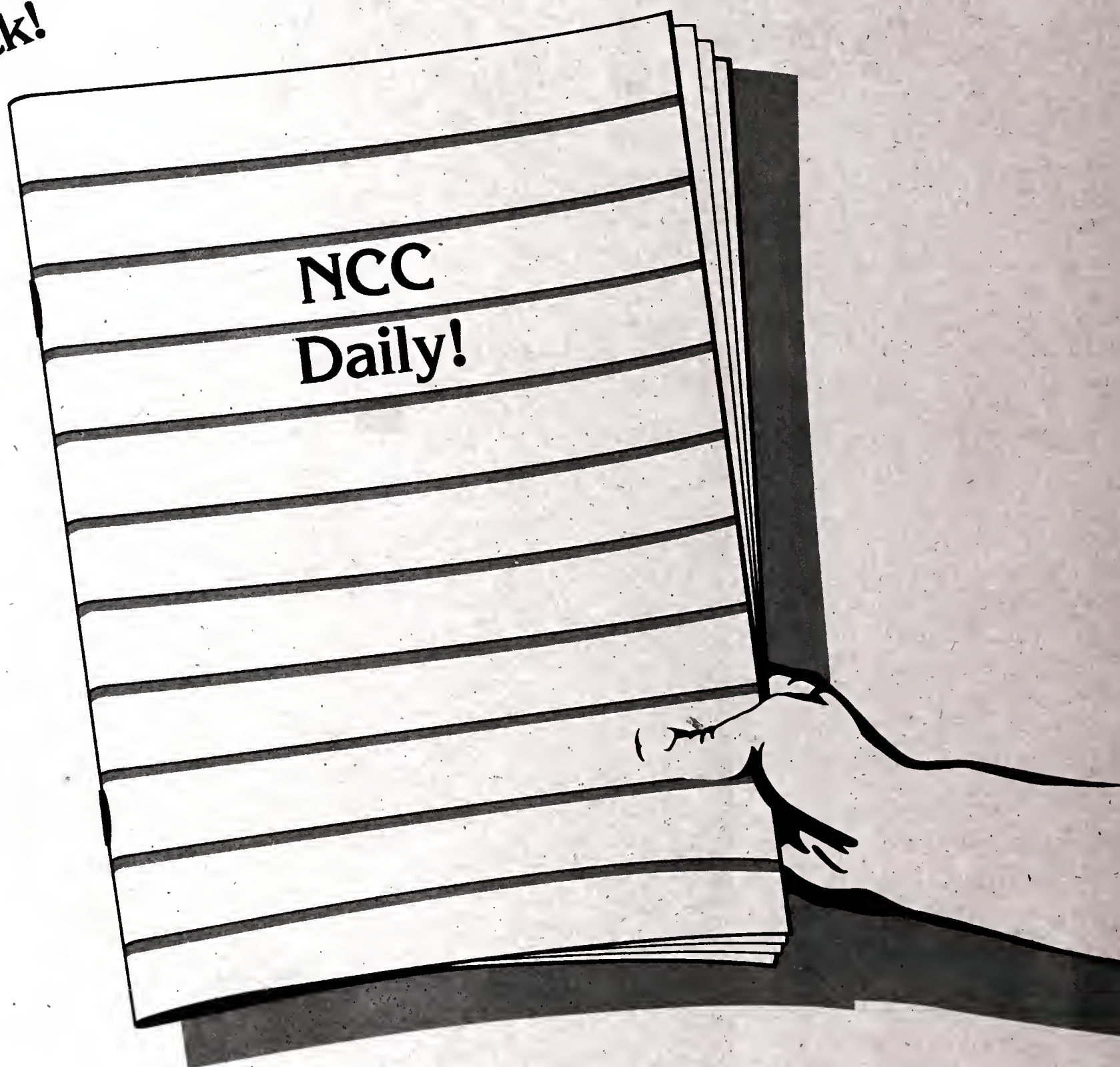
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We'll also cover NCC in three special issues of Computerworld. The July 8th Preview issue. The July 15th Show issue. And the July 22nd Wrap-Up issue. Advertise in these issues and ensure your investment in NCC. And, just as importantly, you'll keep your name in front of more than 687,000 computer-involved professionals all during this eventful period.

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Issue	Issues Dates	Closing Date
NCC Daily!	July 15, 16, 17, 18	June 10 (all 4 issues)
NCC Preview	July 8	June 21
NCC Show	July 15	June 28
NCC Wrap-up	July 22	July 5

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IN DEPTH

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"It's going to be a good long time before they start seeing substantial results from this investment."



"MCC really is an effort to keep mid-size companies independent and still able to play in the game."

MCC revisited

An interview with Bobby Inman

Retired Adm. B. R. Inman is president and chief executive officer of the Microelectronics and Computer Technology Corp. (MCC). This venture, begun in January 1983, is attempting to turn competitors into partners during the research and development stage of products. Inman, who will be the keynote speaker at the National Computer Conference in Chicago July 15, was interviewed by staff writer Clinton Wilder at MCC's headquarters in Austin, Texas.

When the idea for MCC was hatched, some questioned whether companies that compete against each other could work together successfully here. How has the cooperation evolved?

The key decision in the success of MCC, in defining the research programs, was that if the teams defining the programs could envision a product, the research should not go to MCC. What that

means is that companies do not have to transfer in technology that they are now using for competitive advantage in the marketplace. That was probably the critical element in getting these diverse companies to work together. If you were looking at near-term things, and there was a question of somebody transferring in technology that might make a difference in three or six

IN DEPTH/MCC REVISITED

months of getting their product out, I don't know how that would have evolved.

Now that the principle is in place and the legislative action has settled the antitrust issue, then you will see some joint ventures for the near term created along the way. They're not likely to be as broadly based as the long-term ones, but you will see some with problems three to five years out being handled.

There was a lot written about how, for a while, you weren't satisfied with the talent levels of the researchers. Has that changed?

I am delighted with the talent that's here now. But I did not believe that a lot of the people I saw as candidates were of the quality that I needed. The board of directors has ultimately been very supportive of

the approach we've taken, even if there were some early concerns about talent. But as I've noted, once it got started, it took off like a rocket. We get really superb talent, and that serves as a magnet.

In early 1983, the original concept was that all the talent we needed was to be found in the companies; it was just a question of getting it. The actual execution has turned out to be very different.

Lately, we have been blessed by a flood of resumes from people who want to be part of MCC. When you stand back and ask why they want to be part of MCC — it's because of our long-term goals and tough problems, problems where they think they could make a difference. That is what has drawn people, even in the companies. We have had a couple of direct hires who were in the compa-

nies, wanted to get assigned to MCC and didn't. They resigned, and then we hired them directly.

With 21 different companies out there, I presume there are differences in the significance each member attaches to MCC.

Well, it cuts two ways. First, this is an organization that was created from the top down: The chief executive officers and a group of senior people around them made the decision on whether the company would join. When you get into execution, and you get down three or four ladders, you have all of the situations that one should expect.

There are people who see it as competitive. They'd rather use the dollars on their near-term problems than on something long range that they don't know will ever benefit

them. When it gets down several levels and they have to decide who to break loose to send, it is absolutely normal that they would be reluctant to send their very best person working on this year's problem, out of whose performance their whole bonus might be calculated. It's the kind of structure where, to get started, you need senior attention.

MCC was initially envisioned as something where all the researchers, including the research program directors, were going to come from the companies. How have they taken the change to 60% direct hire and all the program directors coming from outside? Has this process led to major misconceptions about the attractiveness of MCC to the companies' researchers?

Perhaps. But again, it was a learning curve. There was an assumption made about where talent was to be found, and none of them ever envisioned that MCC was going to be attractive to so many people who were not in the companies. But the companies have remained very flexible to adapt to the realities of MCC.

I had some advantages. I came from 10 years of managing organizations where I had to get people to work together who didn't necessarily want to but had to. Understanding how you go about that and how that process works was not in [the companies'] experience.

If the success of MCC is gauged by how effectively your research advances are translated into products back at the company level, how is that going to work?

Technology transfer, internally, is a very tough thing to bring off. It doesn't just happen with the wave of a wand. People at the companies initially said, "don't worry about it, we're going to send people on assignment, we'll send liaisons that will rotate and bring the technology back with them." But with 60% direct hire, they aren't going to go back. Over time, the companies are going to have to have their own internal tracking organizations, and they're going to have more of their people come and spend extended periods of time here for hands-on understanding of where we are.

We'll end up with more people here on a temporary basis, as we get closer to the licensing. We're already seeing some companies sending teams — happily with some from the production side — to get them to begin to think about what may come out of here. That's a very good sign.

The 21 companies are very diverse, and that says as you're trying to make decisions, you have to work harder. But if you look at it from a different angle, the likelihood that several of those companies will end up using the technology that has been created is very high. And for what's going to motivate the researchers, it's knowing that what they produce gets used.

So as I look at the diversity and say, oh God, how long is it going to take to get the necessary vote through, I remember that for what's really going to motivate the scientists — the prospect that their technology is going to get used — that very diversity is a strong plus.

How big a role can MCC play once the technology transfer is accomplished?

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How are you ever going to get U.S. corporations to think long-term when the media is saying, 'What did you do last week?'

some of the things we're doing are really just basic research. So it may turn out that the 10-year time line is too close. There will be things we'll learn in both those programs that will impact the next generation of computer designs. But it may turn out not to be as significant as in the other programs.

It must be frustrating to turn the technology out here and then have to sit around waiting for it to be used.

I worry about this topic a lot, and some of my shareholders tell me I worry about it too much and too loudly. But I'm confident because the members know that other companies will have access, that they will try, and they will plan to use this at a fast clip.

We've been hard at work now for more than a year on the mechanics of a master technology transfer plan, getting all the licensing arrangements in place, so at least we aren't going to have bottlenecks in the pro-

cess from this end that slow down the availability.

Even if it means we'll have difficulty later in proving it was our idea that started it — that's a conscious risk that I hope we won't have to confront. But what we've worked on is that there are no impediments from the MCC side in the lack of flow to those that paid for it. This is not a laboratory simply creating ideas to publish and stop.

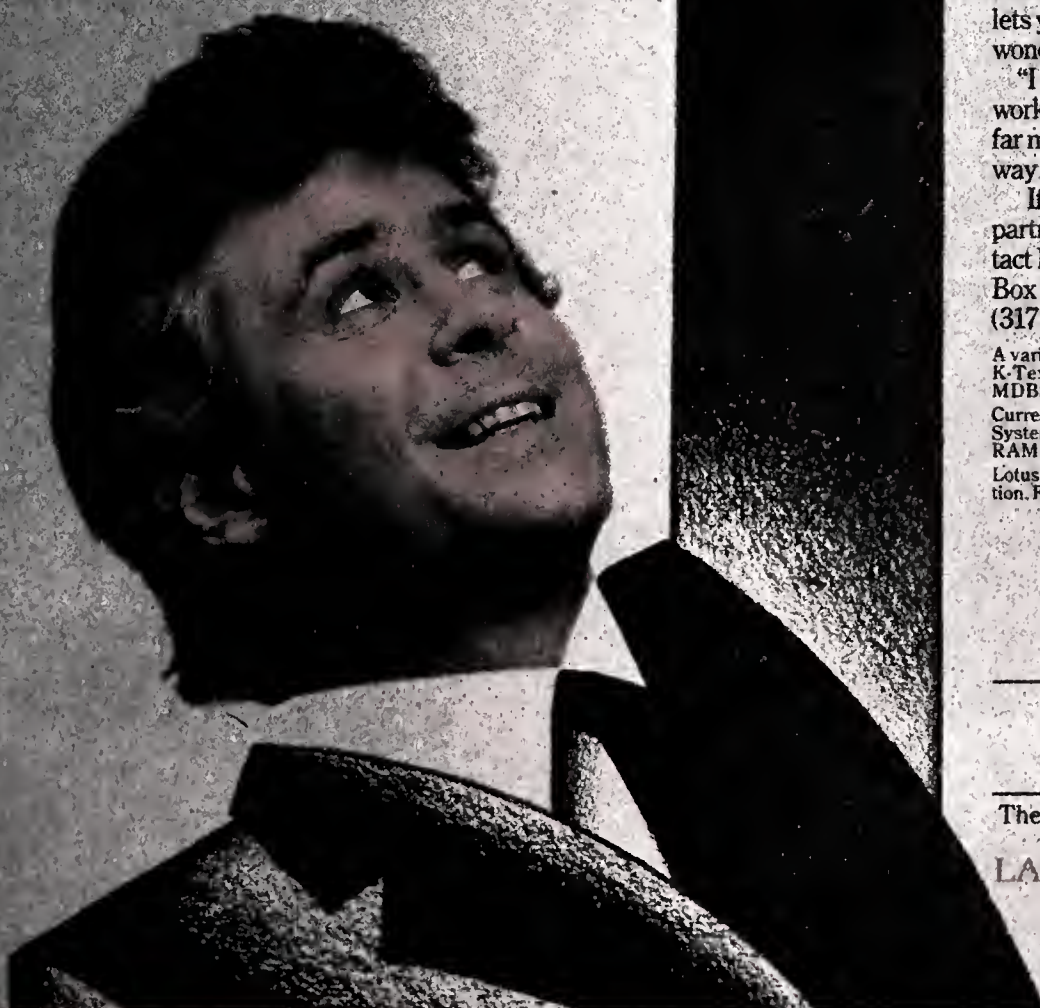
Turning to Japan — how much of an eye are you keeping on them?

To be very direct, I'm keeping almost no eye on them. It's primarily all the questions I get asked from the media that cause me to spend some time tracking [Japan]. It has no influence on research. Now if they were to suddenly have a great breakthrough, we would clearly scramble

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So we will create the technology, we will stream it out to the companies that have funded it and put together the necessary elements for that technology to be turned into products, and we'll say, "License it." We will support that technology for six months, but after that, we're out of it. So we're really supporting it well into the design phase, but not the manufacturing and marketing.

Has MCC come up with any technology so far that you have been able to license?

These are very long-range programs, with deliverables years out. But it's turned out that there are some proprietary approaches that we've taken in-house — the way we are attacking problems, a unique equipment configuration that we've put together or algorithms used in attacking software approaches — that the companies have looked at and said, "Gee, we can use that on our own research activities. We'd like to pull that now." The answer is, we will do it, but we won't support it in that case. We can't afford at this stage to send people off to maintain the techniques that we're using.

Are those the early deliverables we've heard about?

Yes.

So it's really your methodology of doing the research that has produced something to transfer back to the members.

As we've gotten through the planning stage and into the research itself, and with the teams that have been assembled, the uniqueness of the methodology has been a product in itself. It was simply a product, an outcome, that we had not anticipated. It's nice to have some of those because, unless we have fortuitous, unforeseen breakthroughs, it's going to be a good long time before they start seeing substantial results from this investment.

Does it get frustrating to have to keep telling outsiders that you're not going to be turning something wonderful out of here in, say, two years?

Yes, every now and then, my frustration level gets high. A great newspaper on the West Coast that I've admired all my life drew my ire last October with an editorial that said, "Gee, MCC has been in business 18 months, and they haven't produced anything in artificial intelligence and neither have the Japanese, so it's clearly a bad idea." I mean, that's a 10-year program. Now if 10 years from now we haven't produced anything that's usable, then that's a good [comment]. How are you ever going to get U.S. corporations to think long-term when the media is saying, "What did you do last week?"

Looking at the programs we have now, in five of them, you can already envision the kinds of things you can do and the directions they will go within the time frames. The two that are somewhat more problematic are AI and parallel processing. There, all the theory hasn't been developed. So

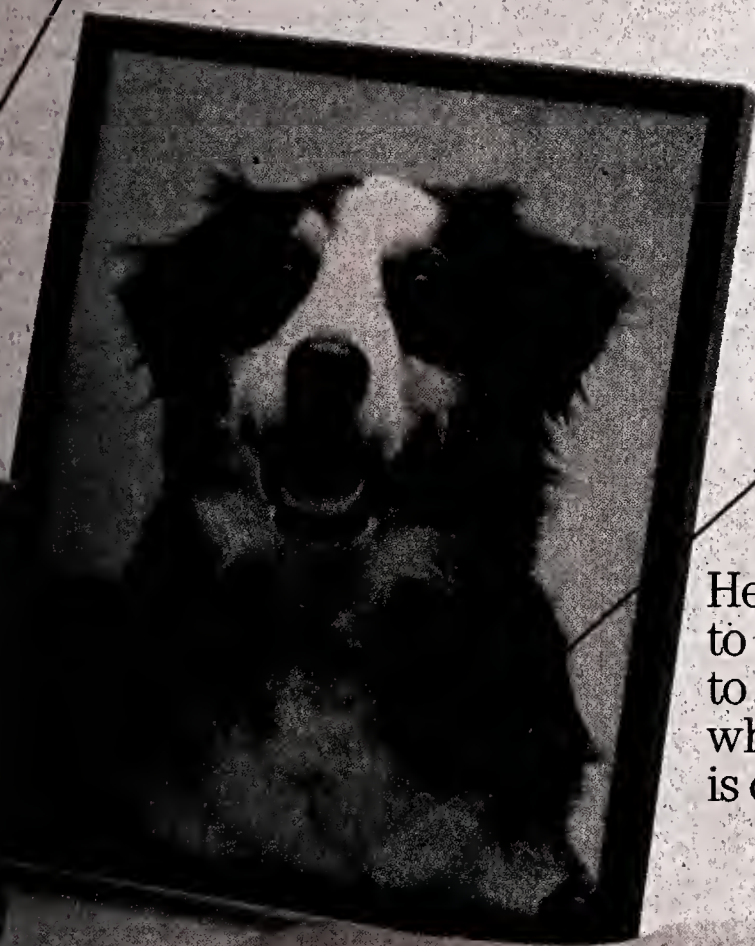
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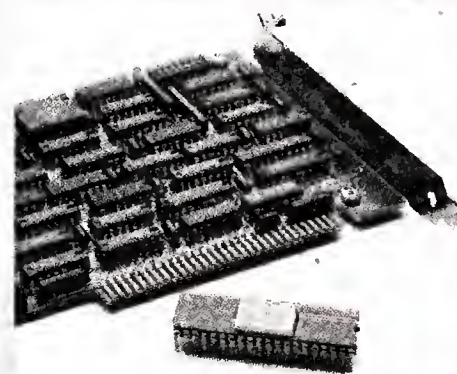
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to say, "Where are we? Did we try that? If not, why not?"

But short of that, first, there isn't a flow of information that gives you great detail on approaches the Japanese have taken. If [Nippon Telephone & Telegraph] would like to make very clear what it is doing and how it's doing it, my attention level would go up very quickly. But for the rest, I simply track reports I see and get reports back from people who've attended a conference there.

I have great respect for the Japanese. I expect that they will turn out some very usable products, and they have a shot at creating new technologies before they appear in the U.S. But I don't have a great sense that we are, at this point, behind in creating the technology. Where my worry lies is in the implementation.

If you look at the history of the

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I have great respect for the Japanese. I expect they will turn out some very usable products, and they have a shot at creating new technologies before they appear in the U.S.

last 15 years, where the Japanese have made their great advances has been at the speed with which they take their new technology to market—place . . . in quality control, manufacturing, the skill in the market. So we could end up producing technology two years before the fifth-generation effort, and that could end up making little difference in the competitive marketplace, unless the U.S. firms can move the technology to market-place at a faster rate than they have

in the past.

What are your thoughts on trade barriers?

I'm opposed, instinctively. As I look back over history, whenever we've turned to them, results have been disastrous over the long term. The way you avoid those is by the speed with which you introduce the new technology.

If you ask me what in the country worries me like that, I worry that I

don't see more focus on manufacturing technology. We're not really doing anything at all. I see a lot going on inside General Motors, General Electric—I presume it's going on inside IBM, but I don't see it in small and midsize companies.

I really worry about whether we are doing enough in this country to bring emerging technologies to bear, on modernizing basic industries to make them more competitive and productive.

How much does your own background help?

Almost none. I am an analyst of the Soviet Navy and Soviet government, things like that, not on Japanese technical matters, so I have little to offer them in that case. My experience was in electronic surveillance, and we're not engaged in that now, nor is there any possibility we would be. So my background turns out to be not that relevant.

Is IBM seen as a threat in the specific research areas MCC is pursuing?

A competitor, not a threat. I would expect they have very viable efforts going in all of these areas. Does MCC have any advantages in that competition? The answer is yes. We have advantages for the scientists who would prefer to work in a small organization, with a higher prospect that their specific contributions will be very visible.

IBM has existed for many years, and no one ever came together in response to it being there. Obviously, if MCC ends up making some of [the member companies] more economically viable, it also makes some of them more viable with regard to IBM. But I doubt that Boeing, Martin Marietta, Rockwell, Lockheed, Kodak or Bellcore, for that matter, are giving much thought to what IBM is doing.

Clearly, some of our shareholders will be vitally impacted by what IBM does at the marketplace, both in products and tactics. But for some of the others, their only interest is whether IBM is going to be purchasing their equipment.

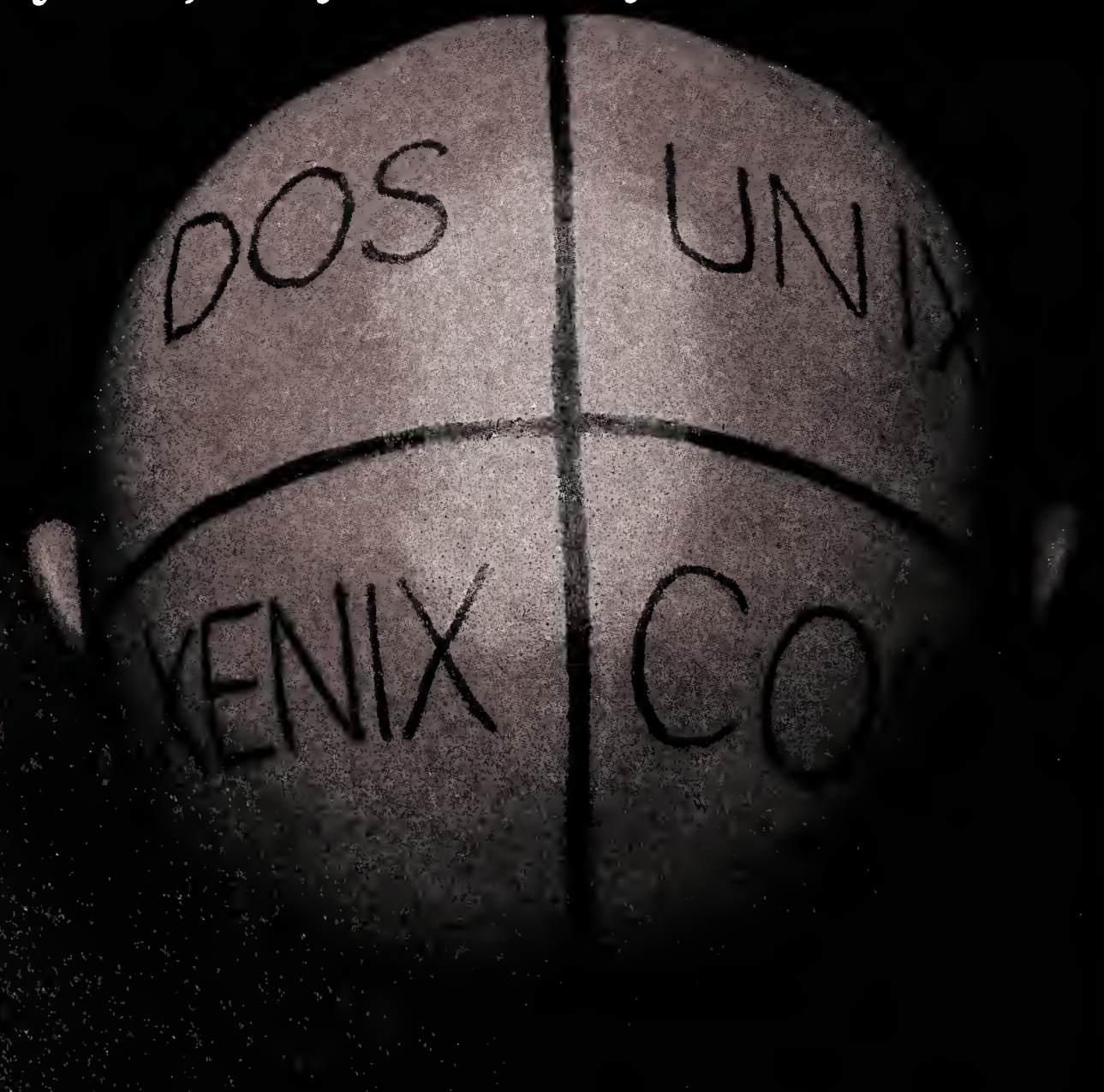
But what about IBM's \$4 billion R&D budget?

It's enormous. It's like another element of the federal budget, as is General Motors'. That has been our history, that as an industry matured and the cost of R&D became very high, you only had a few giant corporations because everybody else fell out. MCC really is an effort to keep middle-sized companies independent and still able to play in the game. That's what is going to be interesting to see.

There have been some indications that you may start a new research program. What is the status of that?

It's still in the formative stage. Originally, the board thought we should not contemplate any additional programs before 1986. But by last fall that changed, and there was no longer any doubt that MCC worked, so we accelerated the process of looking at some additional programs. We've done that, starting in March, but it's not proceeding as fast as I thought earlier. It takes a lot of hard work to lay out the specifics of a program that people would actually want to be a part of and invest a

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We're a little ahead of the most optimistic hopes. There's no longer any doubt that diverse, competing companies can pool talent to attack long-term problems.

substantial amount of money in, particularly in a time of economic downturn.

Has the relationship between MCC officers and shareholders executives changed?

It was clearly the intent of the shareholders that they be directed by a CEO and principal officers here, not by committees of shareholders. I am very quick to ensure that we have no erosion of that.

What about keeping research information proprietary for the companies that funded it?

That is an area where my past experience is relevant. In all my National Security Agency years, the key was to get scientists to exchange ideas and attack very tough problems. And then you compartmented the actual application for national security reasons.

Here you do it for proprietary reasons. So I know that

the process can be made to work.

In terms of your original expectations for MCC, what is your assessment at this point? Is there any reason to doubt the high hopes?

I would say we're a little ahead of the most optimistic hopes. There's no longer any doubt that diverse, competing companies can pool talent to attack long-term problems.

You can build the teams, the funding profile works, ideas are going to tumble out.

What we clearly haven't established and won't for several years is that which turns out to be technology that gives an edge in the marketplace. But for the totality of the concept of joint venturing for creating that technology, there is no longer any doubt about that at all. It is a process that works.

The record will not be complete, though. The concept wasn't just to prove you can do joint research, but was this approach going to give us a competitive edge in the marketplace? And that is where the jury is still out.

Can you envision an MCC without Bobby Inman?

Oh, sure, very easily. You could have a number of other MCCs.

I brought some experience that was relevant in getting started, but you've already got a half-dozen people around here who could go run an MCC.

I'm not looking for someone to come replace me at this point. It's still in the building stage, there are new things that come along all the time, and that's what's exciting and fun about it. Whether it will be the same way five years out, well, I don't know.

But I was very careful from the outset to structure an organization that was not dependent on me. I made a mistake 10 years ago, when I was the director of Naval Intelligence, in having everybody report directly to me, and I made the decisions. I loved it, but it was awful, because I suddenly got pulled out of the job and promoted.

And I learned the very painful lesson that you don't structure an organization to be dependent on a single individual.

My real key here was to prove that the concept could work. That is behind us. Now the goal is to evolve it into a healthy, long-term organization, introducing some additional programs, getting through some actual technology transfer processes where the companies pick up the research.

Those are still real challenges.

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IN DEPTH

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The MCC payoff

Getting the technology back home

By Clinton Wilder
CW Staff Writer

Technology transfer.

It's a buzzword heard often in the offices and research rooms at Microelectronics and Computer Corp. (MCC), appropriately located on Research Boulevard on the edge of fast-growing Austin, Texas. Loosely defined, it means the process by which the 21 computer, electronics, aerospace and other companies that own MCC hope eventually to convert the research done there into proprietary products back home.

MCC's long-range research goals, such as fifth-generation computer advances, have met with both praise and skepticism in the U.S. computer industry. But for 21 firms investing substantial amounts of research and development money in the ambitious project, the jury on MCC is still out — and will be for the next several years. The member companies will judge the success of MCC not by what is accomplished in Austin, but by how quickly and how well those accomplishments become products that enhance the members'

Semiconductor Packaging and Interconnect Technology is one of seven research programs under way at MCC in Austin.

Scheduled to open in mid-1986 is MCC's permanent office and research headquarters, a 200,000-square foot building leased from the University of Texas.



IN DEPTH/MCC PAYOFF

competitiveness with the Japanese and each other.

"At Honeywell, we have a saying that nothing happens until somebody sells something," says Richard Hill, a Honeywell, Inc. MCC liaison working in the artificial intelligence component of MCC's Advanced Computer Architecture (ACA) research program. "Well, nothing happens at MCC until the technology gets transferred. It's a live or die issue."

"Any company that doesn't prepare for that technology transfer back home is a loser," Control Data Corp. liaison Ellen Boughter says bluntly. "They would lose their whole investment."

By the standard financial measure of investment value, MCC has progressed quite well since its 1982 conception as the American answer to the Japanese Institute for New Gen-

eration Computer Technology (Icot) research effort. In 1983, MCC set up shop with the 10 charter members becoming shareholders for \$150,000, plus their investments in at least one of the four research programs.

Today, a share goes for \$1 million, and some of the programs, including the highest funded ACA program, have also increased the price of participation. Having added 11 new members and 13 peripherally involved associate members, MCC has

seen its annual budget grow from \$35 million in 1983 to an estimated \$65 million this year.

By other standards as well, MCC has made significant strides since a rough start. Because MCC's news-making chairman and chief executive officer, retired Admiral Bobby R. Inman, began looking outside for researchers, most programs have begun to take off, the members say. Company liaisons believe MCC's transition from 100% shareholder

employees to just 40% was an inevitable growing pain.

"The idea that members weren't sending their best people to work at MCC was a naive criticism," Hill says. "The people [candidates that Inman refused] were very good at what they do; it's just that they don't do this kind of thing. We quickly came to the realization that to do the 10-year perspective kind of research that MCC was formed to do, you needed a whole different breed of cat."

In the Software Technology program, for example, Inman deliberately held back the entire project until he found the right program director from outside — Laszlo Belady, a 23-year IBM veteran most recently in charge of software at Big Blue's Japan Science Institute. "He exercised his veto power to turn away people who didn't measure up," says Sperry Corp. MCC liaison Arthur Schneider. "The whole cadre of technical people there now is absolutely first class."

New identity

The result is a different identity for MCC, one that officers and participants say is greater than the sum of its parts. "When people come down here to work from the companies now, they hang their corporate IDs on the back of the door and become MCC employees," says George D. Black, MCC vice-president of Human Resources. "We've seen a remarkable difference in the last year in the number and quality of people who want to be part of MCC. People come because they want to be part of a whole new way of doing business in this country."

Part of that mind-set is MCC's emphatic commitment to the future. While the computer industry, like any other American business, is geared toward the balance sheet of the current quarter or the executive bonus at the end of the current year, MCC does not expect its research programs to produce tangible, transferable results much before the end of this decade. It is an orientation that nearly all members' liaisons say they lack back home.

"That is certainly true at Control Data," says Boughter, a researcher in the ACA data base component at MCC. "It's extremely difficult to get funding for any kind of high-risk, long-range project."

"Who in the U.S. first kicked off a fifth-generation project looking at computers of the 1990s?" asks NCR Corp. liaison Joseph Scullion. "We, as companies, simply didn't do it. The advances of the past 20 years have been so rapid that we had plenty to do just mining what we know now without pushing things even further. There was a lack of urgency in looking at the long term."

But the urgency came from across the Pacific when Japan, with uncharacteristic fanfare, announced the Icot program in early 1982. Several computer industry leaders, most vocally CDC Chairman William Norris, decided the U.S. needed more than scattered corporate research efforts in order to keep up with Japan.

"I don't agree that the lack of a centralized long-term effort delayed the development of today's computers," says Honeywell's Hill.

"The advances of the last 20 years came out of the U.S., out of a free market system and piecemeal development. But maybe things have changed, and it's necessary to do it

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IN DEPTH/MCC PAYOFF

this way today."

Joint R&D agreements are nothing new, but the merging of 21 diverse companies with outside talent in a 325-employee corporation is. Liaisons talk about gaining a greater critical mass of research talent at MCC and better leverage of their R&D budgets, but they admit the risk is greater, too.

"R&D is always a risky business," says Larry Matteson, MCC liaison for Eastman Kodak Co., which spends \$3 million every day on its own extensive research. "MCC's approach is certainly more innovative and has greater risk in that it has the greater challenge of technology transfer. But we hope to get much greater R&D results for the dollar than we would otherwise."

MCC is not viewed by member

companies as the end-all of computer research but simply as an innovative project that may or may not pay off handsomely.

"We don't have all our eggs in the MCC basket," says Schneider of Sperry, one of just three members (with CDC and Harris) that have invested in all four research programs. "We have other outside research contracts with the Semiconductor Research Corp. (a 40-member consortium) and universities. We see a higher probability of MCC actually accomplishing something for us, but it's certainly not our only source."

Careful monitoring

Another aspect of risk for MCC is the chance of proprietary research leaking out — either outside of MCC or across MCC program boundaries to a member company not funding a

particular program. MCC has followed the lead of Inman's former National Security Agency directorship, monitoring the flow of public information with a very careful hand. Even the lists of what members are participating in which research programs must be released by the companies, not by MCC.

"Regular corporate organizations start by saying nothing is confidential until they make it so. We do it exactly the opposite," says Pale F. Smidt, a Burroughs Corp. and Sperry veteran who became MCC's senior vice-president in charge of programs and corporate planning. "We start with the notion that everything is confidential, and we have to make it not confidential."

Internal security, however, is much more difficult to monitor. With the exception of its clean room for

semiconductor research three miles away from the corporate offices, MCC's research rooms are not strictly grouped by the four research programs — Software Technology; Very Large-Scale Integrated Circuits and Computer-Aided Design (VLSI/CAD); Semiconductor Packaging; and ACA (comprising subprograms of Parallel Processing, Data Base, Human Interface Technology and Artificial Intelligence).

A company funding only one research program could pirate trade secrets from the others. But in practice, that hasn't happened, company representatives say.

"Bob Inman has pointed out that MCC is a unique experiment," NCR's Scullion says. "He has requested and received the commitment of everybody here to adhere to high standards of discipline and fairness. We

Members of MCC

Twenty-one U.S. companies own and set policy for MCC. The companies include the following:

Advanced Micro Devices, Inc.
Allied Corp.
BMC Industries, Inc.
Bell Communications Research Corp. (Bellcore)
Boeing Corp.
Control Data Corp.
Digital Equipment Corp.
Eastman Kodak Co.
Gould, Inc.
Harris Corp.
Honeywell, Inc.
Lockheed Corp.
Martin Marietta Corp.
Mostek Corp.
Motorola, Inc.
National Semiconductor Corp.
NCR Corp.
RCA Corp.
Rockwell International Corp.
Sperry Corp.
3M Co.

Associates Program

The Associates Program was formed in 1984 to allow mainly (but not exclusively) smaller companies to learn more about MCC without investing very large amounts of money.

For investments ranging from \$25,000 to \$150,000 (although most are at the \$25,000 level), these companies receive technical reports, attend MCC symposia and have access to other nonpublic, but also nonproprietary, information.

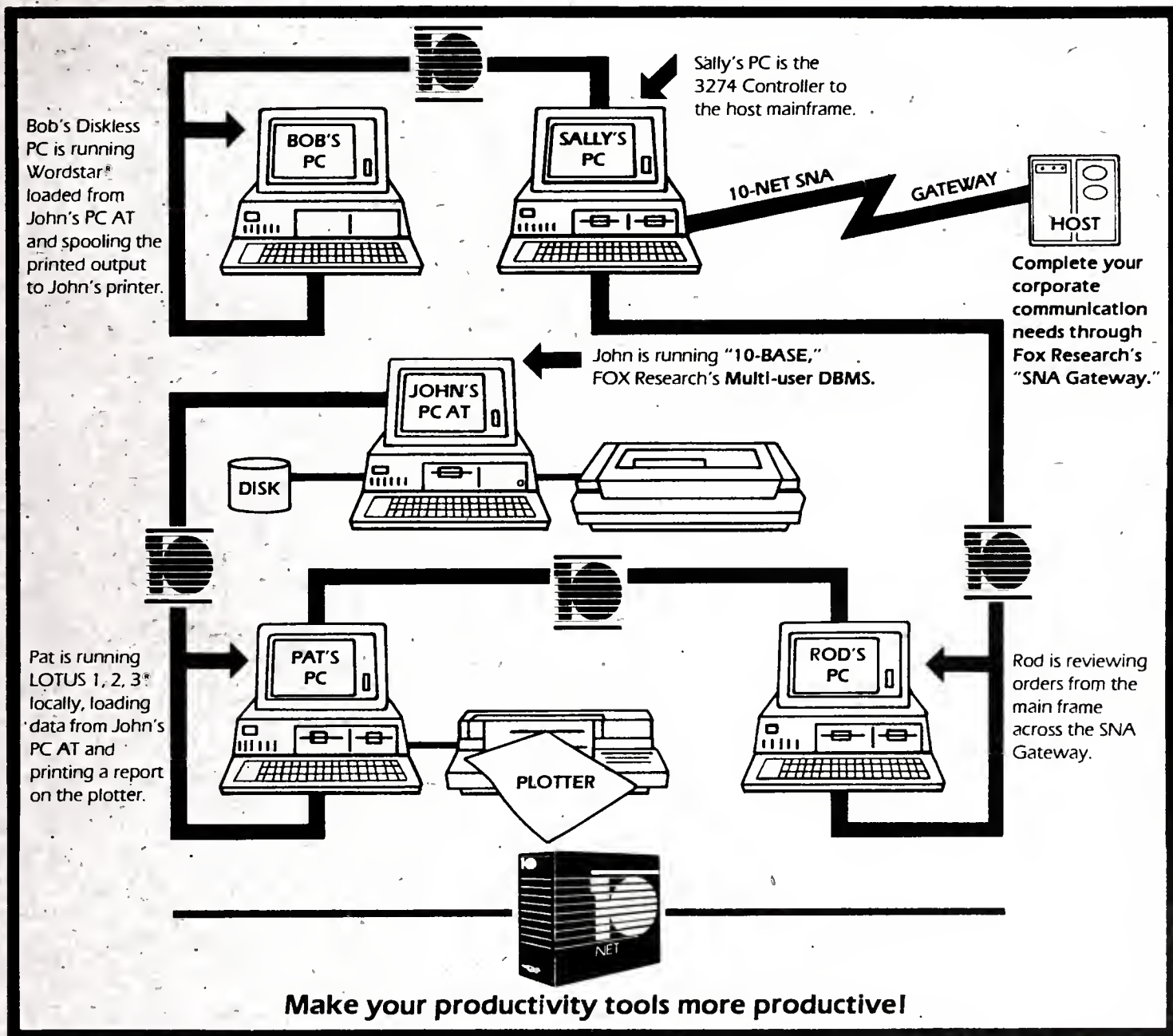
The Associates Program is a means for these companies to get a feel for what MCC does and what technologies might be likely to emerge without getting involved directly in the research.

The associate members include: Aluminum Corp. of America (Alcoa)

Celanese Corp.
Execucom Systems Corp.
Magnavox Government & Industrial Electronics Co.
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IN DEPTH/MCC PAYOFF

want to foster communication, even across programs, while maintaining an awareness of the fairness doctrine. If a little bit slips through here and there, we really can't cut off all communication to stop a little bit of flow. For the most part, it's a self-policing attitude. People here are much too busy with their own projects to run around being industrial spies."

"In the data base program [of ACA], we work directly with people from CAD and software technology," Boughter says. "If a shareholder in CAD did accidentally get some proprietary information from Data Base, what would they do with it? They're not prepared to receive it, and they're only getting a small piece of what's going on. It could be totally misleading."

The MCC liaison from one CAD

program member, Gould, Inc., says that security was a key concern in Gould's decision to join MCC. "One of the tests that I applied to MCC was whether it would be necessary for me to disclose things in the VLSI/CAD program that are proprietary to Gould," says Joseph Rowe, the company's vice-chairman and chief technical officer. "The rules are set up so that you don't have to do that. Sure, one wonders how much hallway conversation goes on. But I have not

heard many members express concern on that topic yet."

Another aspect of working together is the varying levels of support for MCC among member companies. Shareholders differ in their approaches to MCC — and enthusiasm is not necessarily commensurate with how many programs the shareholder has elected to join.

"I know that at Honeywell, MCC is held out as a very desirable assignment," says MCC's Black. "Another

company [DEC] published its own brochure about its participation, and that kind of publicity is evidence of the value and commitment it attaches to MCC. There are some members with people back at the parent company who believe there are better uses for the resources they have committed to MCC. On the other hand, some companies, left to their own devices, would fund the entire organization."

"Without naming names," says Schneider of Sperry, "some companies are jumping in with more aggressiveness than others. But I believe those are the ones who will get more out of it. That, in turn, may lead to a change in membership as the thing shakes out."

Global significance

In looking at the future, MCC members, while not exactly expecting Japanese surveillance teams to set up shop in Austin, are very much aware of MCC's global significance. It has been said that the landing of a man on the moon, perhaps the U.S.'s greatest technological achievement, occurred because the goal — to succeed before the end of the 1960s and before the Soviet Union — was so clearly defined. Will the fifth-generation computer be the Apollo spaceship of the '80s and '90s?

"I think it is a race," says NCR's Scullion. "If we just continue to milk the technology that we have in hand, we're going to miss the opportunity that the Japanese have identified to make quantum leaps forward in computer technology. What is different now is that they have said they're not just going to follow a year or two behind [the U.S.] and do it cheaper and take the market away that way. They have actually stated a different perspective than they ever have before: 'We will be the leading information processing country in the 1990s.' They've identified that as the only way to have a strong economic position, because the only resource they have is their people."

"It's not a race like creating the atom bomb during World War II," says Honeywell's Hill, "as much as it is a kind of rededication on the part of the U.S. to technology as a way of life."

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Research breakdown

MCC members can choose one or more research programs in which to participate. Their choices include the following:

Advanced Computer Architecture: DEC, Sperry, Eastman Kodak, NCR, CDC, Honeywell, Bellcore and Harris.

Packaging and Interconnect Technology: DEC, Sperry, Eastman Kodak, CDC, Allied, Boeing, Mostek, Advanced Micro Devices, BMC Computer Corp., 3M and Harris.

Software Technology: DEC, Sperry, CDC, Bellcore, Lockheed, RCA, Rockwell, NCR and Harris.

VLSI/CAD: Sperry, CDC, Honeywell, Gould, Mostek, Advanced Micro Devices, Lockheed, Harris, Martin Marietta, National Semiconductor, NCR, Motorola and RCA.

IN DEPTH/MCC PAYOFF

leading-edge, quantum leap computer research — the hype of MCC — can only sustain the project for so long. The headlines about MCC's formation and the controversy over Inman's selection to lead it have given way to a quieter period in the last six months, one that has prompted skeptics to ask, "So what are they really doing down there?"

But MCC insiders say this is when the true progress has occurred — the steady increase in employees and an unexpected breakthrough in research methodology that has given the participating members a tangible new way of doing research that they can apply in product development back home. MCC officials are predictably tight-lipped about this proprietary deliverable, but liaisons say it is a good indication of MCC's progress exceeding its expectations.

"We fully expected there would be a long period of time where we would have to learn to work together and that it would be two to three years before we began to see anything," Scullion remarks. "The fact that we're seeing something in 1985 is a pleasant surprise."

No MCC label

All comments about MCC's success to date, however, come with an implicit qualification. There will never be a computer, software package or chip that bears an MCC label — only MCC research gains that help build those products.

While MCC, specifically Smidt, has devoted hundreds of man-hours to drawing up a formal plan for transferring and licensing MCC technology to the companies that paid for it, MCC must, by strict antitrust law, stay away from product development at the shareholder level.

So MCC's ultimate success or failure will not be determined in Austin, but in product development plans at DEC in Maynard, Mass., or Honeywell in Minneapolis or Sperry in Blue Bell, Pa.

"If we have done our part of the job, but the [share-

holders] cannot cope with the business issue and not get the performance out of the deployment of our resource, then we will look bad also," Smidt says. "We can only make things possible. . . we cannot execute the possibility."

Because 21 different corporations hope to convert MCC advances into money-making product lines, there could be as many as 21 different approaches to aid and abet that process. In reality,

some companies have set up similar types of MCC tracking at their own corporate levels, but there are differences as well.

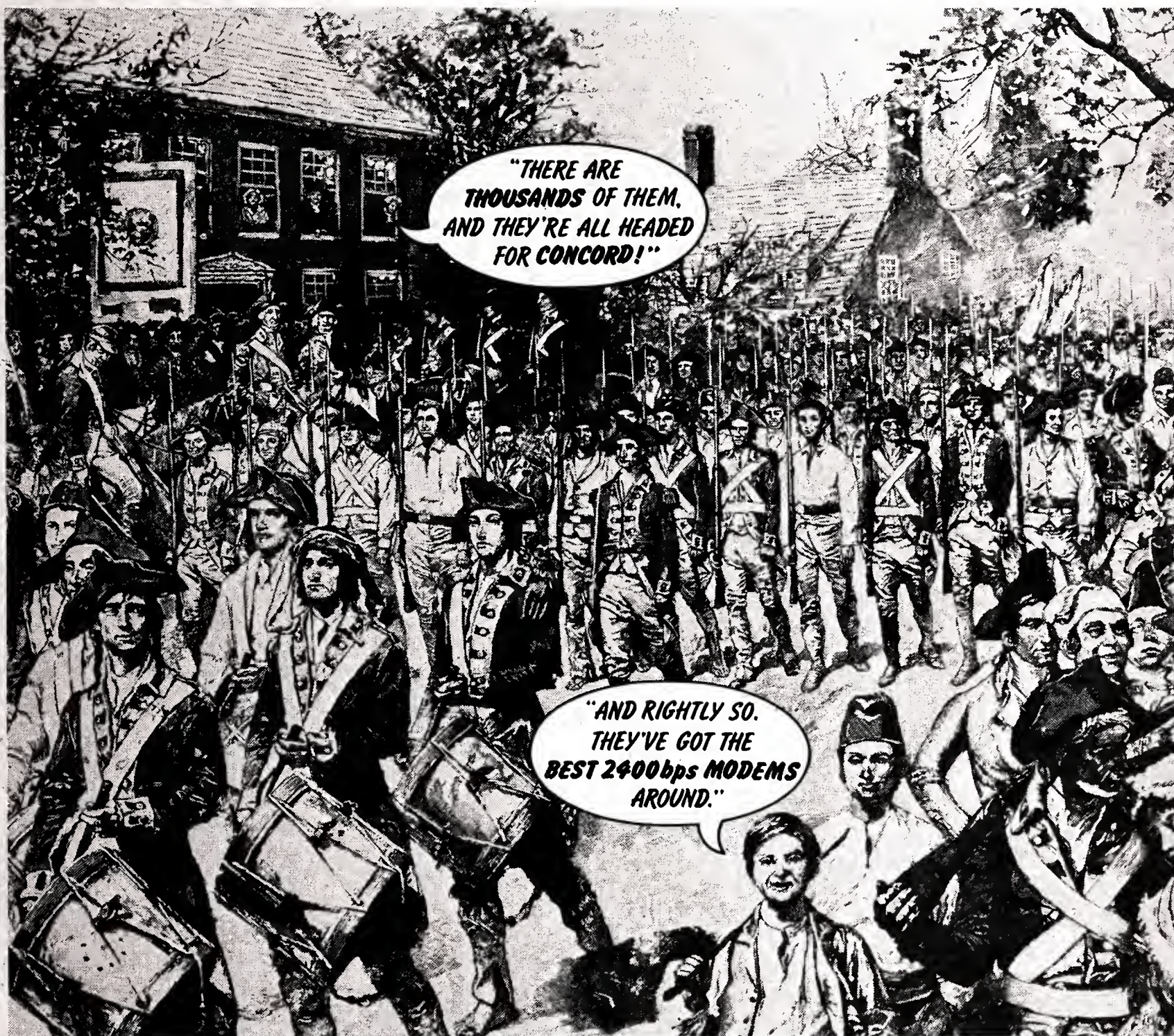
DEC, for example, has established and funded formal "advanced development organizations" within the company to keep tabs on MCC research, trying to ensure that the research remains relevant to DEC's research goals. "These groups are an integral part of product development organizations,"

says DEC liaison George Champine. "They are in the best position to pick and choose the right technology to go into the right products at the right time. There is a formal funding program to help that happen within Digital."

Honeywell's tracking is not quite as formalized as DEC's, but it is every bit as committed to maintaining constant contact. Last month, the company sent 20 of its research and product

development employees to Austin for two "Honeywell Days" to learn more about the direction of the human interface program within ACA.

"We've tried to push the contact level down as close to the grass roots as possible — we think that's the way to do technology transfer," Hill says. "We have an established organization that's the focal point for contact with the ACA program and a number of other divisions



H. Pyle. Victory Parade, 1783. Courtesy The Bettman Archive.

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IN DEPTH/MCC PAYOFF

with specific interests that have established their own contacts as well. It's kind of a loose federation, but it seems to be working. And part of our job as liaisons is to contribute to managing that flow of information while we're here."

At NCR, the tracking consists of reorienting relevant departments to follow MCC, rather than establishing new organizations. "We haven't formally established programs that track, one-for-one, what's going on here," Scullion says. "We have identified those areas within the operating units of the corporation that will best utilize the technology we're developing. It's not exactly a shadow organization, but a question of identifying the things that are already established as the appropriate transfer points."

The need to create some sort of

mechanism for the transfer may have the residual benefit of learning to streamline research, product and strategic planning communication within the member companies, Hill believes.

"Before MCC, we all tended to underestimate the technology transfer problem, even though we faced it internally," the Honeywell veteran says. "We have advanced technology labs that are different from product development divisions, and we have gone through the experience of trying to move the technology out of the lab into a production setting. When it got difficult, we'd just sort of run into it and say, 'yes, it's a problem,' without approaching it in any kind of organized way. But now we're in a situation where it's the name of the game."

The speed of the research-into-

product process will be critical as well. Although the research itself takes place in a long-range time frame, the time for converting research advances into corporate revenues is shorter than ever. "When I started in the industry in 1959, we had things in the product line that generated revenue for 30 and 40 years," MCC's Smidt explains. "Today, there are products that spend less than 12 months in a revenue-generating phase. So if you miss time, it has a tremendous effect on your competitiveness."

In mid-1985, the members' judgment of the technology transfer process, and by extension the success of MCC, remains a waiting game. There will most likely be no tangible evidence for that judgment for several years. But no members are publicly voicing regret that they got involved;

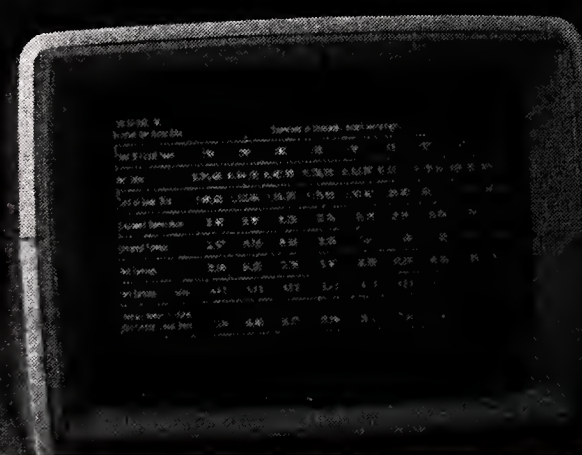
most believe that MCC has gone well so far, and they are willing to stick around for the long term. MCC officials happily point to the recent unanimous, eight-shareholder vote to increase their investments in the already highest funded ACA program as a good sign.

"I don't think any of the shareholders have set any specific goals in

”

In mid-1985, the members' judgment of the technology transfer process, and by extension the success of MCC, remains a waiting game.

FINANCIAL EXPERT.



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Equipment Depreciation	26,864	26,851	25,236	23,796	21,375	20,857	16,454	14,184	11,678
Interest Expense	32,977	19,715	25,826	29,836	27,817	19,186	16,855	17,878	16,868
Net Earnings	85,145	64,122	72,295	78,067	65,722	69,278	56,266	37,856	29,412
Net Earnings % of Sales	4.4 %	4.3 %	4.9 %	5.0 %	4.6 %	5.2 %	4.9 %	4.2 %	4.4 %
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terms of target dates," Hill says. "They all realize this is a 10-year program, or maybe even longer."

"We can only judge qualitatively at this point," says Sperry liaison Schneider. "The research programs are still new. . . the software program is very, very new, with the leader [Belady] coming on board less than a year ago. In terms of working out the responsibilities of a lot of different people, MCC has so far done all the right things. That doesn't guarantee success, but the things are in place that spell success, or at least a high probability of it."

Ultimately, the power of MCC to guarantee its own success is limited. Its long-term survival, financially as well as in the eyes of the industry, depends completely upon what happens when its research gains are sent back to its members.

MCC will derive income from royalties on the sale of products that incorporate its technology, but more important, the successful development, marketing and sales of those products will be the gauge for members to decide to stay with MCC, increase their investment in it or abandon it.

"If the performance is not up to its budget in the shareholder environment," says Smidt, "everything will be ascertained as to whether they should still put that much money in this or that. That's an area that will never go away, and MCC, because it's long term, obviously does have exposure in that area."

"MCC can do the best research and document it in an absolutely top-rate way," adds Bill Stotesbery, MCC's director of government and public affairs. "But if it goes back to the companies and isn't used, then we'll still be viewed as a failure. It's not only critical to the commercialization of the research, it's crucial to MCC's future as well."

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IN DEPTH

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"Picking the right system can be the difference between success and catastrophe. Benchmark and study all you can!"

Picking the best Cadd system for you

By Joel Orr

The right course in choosing a computer-aided design and drafting system (Cadd) lies between "select any one" and "study them all." There are differences — some substantial — among systems; there are greater differences among vendors. Most important is matching what the vendor is offering to what you need.

Most Cadd disasters are caused by users focusing on system fea-

tures instead of their own requirements. As with most types of computer systems, it is incumbent upon the buyer to figure out just how to apply the computer to the task at hand. Those who fail to do so have no one but themselves to blame for a negative outcome.

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IN DEPTH/PICKING A CADD SYSTEM

"

Turnkey Cadd vendors have ranked among the fastest growing and most profitable enterprises in this country for several years.

The many success stories showing genuine gains in productivity (at least for drafting). Con: The fewer — but disturbing — accounts of catastrophic failures. These complex and powerful tools can be well-used or misused.

Fifteen thousand turnkey Cadd systems testify that this approach to engineering automation is popular. Some estimates show turnkeys holding more than 80% of the Cadd market (if IBM's products are counted as

turnkeys). A turnkey is commonly defined as a combination of hardware and software acquired from a single supplier that requires no additional purchases before it can be put to its intended use.

This definition does not touch upon the main reason Cadd system purchasers prefer turnkeys to the alternatives: an understandable fear of confronting the problems of interfacing pieces of hardware and software.

The rampant growth of technology has led to increasing specialization of suppliers. Those who make excellent computers seldom have the resources to become expert at producing applications programs. Manufacturers of color displays rarely develop fine computers. Other examples abound; clearly, there is simply too much to know about Cadd technologies for a single supplier to do it all very well.

Another type of diversity is apparent in marketing. Firms that sell components of systems do not usually become successful systems suppliers. The two markets are very different and require different strategies and tactics.

Components vendors must have a thorough understanding of the technical aspects and competitive benefits of their products and must be adept at negotiating. Sellers of systems must develop a sensitivity for organizational considerations and must be more attuned to solving the customer's problems than to meeting his stated needs.

Turnkey systems suppliers take the responsibility of making the system components work well with one another, both prior to system installation and (usually) for the useful life of the product. Simple economics would indicate that the addition of the middleman between the manufacturers of system components and the consumer requires the price of the turnkey to be greater than the prices of the sum of its parts, and this is indeed the case. But most buyers feel the difference is well worth the cost.

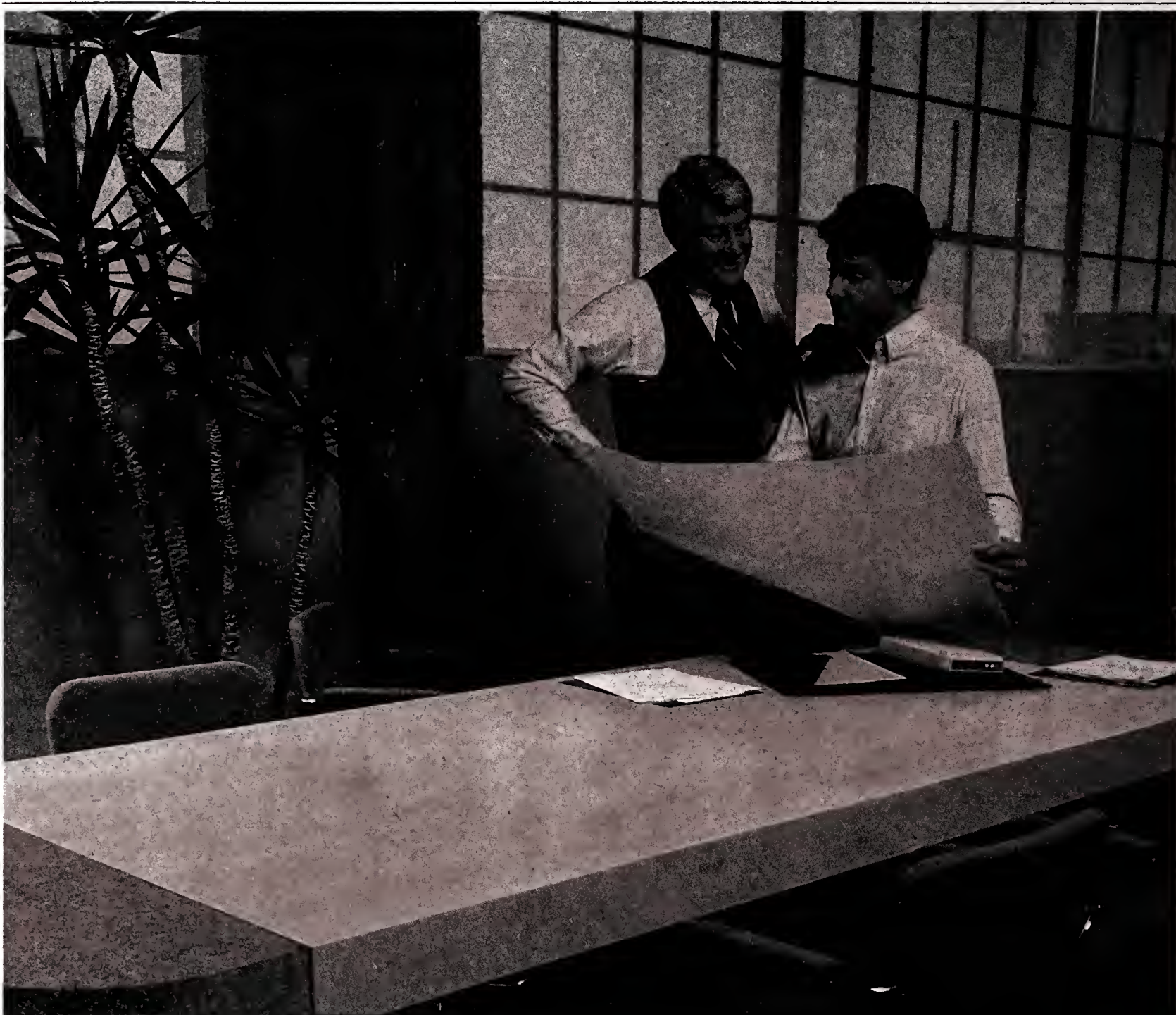
Suppliers feel that way, too. Turnkey Cadd vendors have ranked among the fastest growing and most profitable enterprises in this country for several years. And for most of the leading Cadd vendors, field service is a profitable operation.

Getting more

Turnkey Cadd systems are tools of considerable generality. To get the most from them, users must take advantage of the customized features provided by the vendors. On most systems, it is possible to group combinations of oft-repeated commands as a new command, which can then be activated by a single menu pick or key-stroke.

At Boeing Commercial Airplane Co., families of parts have been defined on Computervision Corp. systems so that new parts can be drawn by merely entering a few parameters. This arrangement saves time and money and ensures consistent and accurate drawings.

Nonturnkey systems are often more difficult to customize than turnkeys. While they are ultimately more



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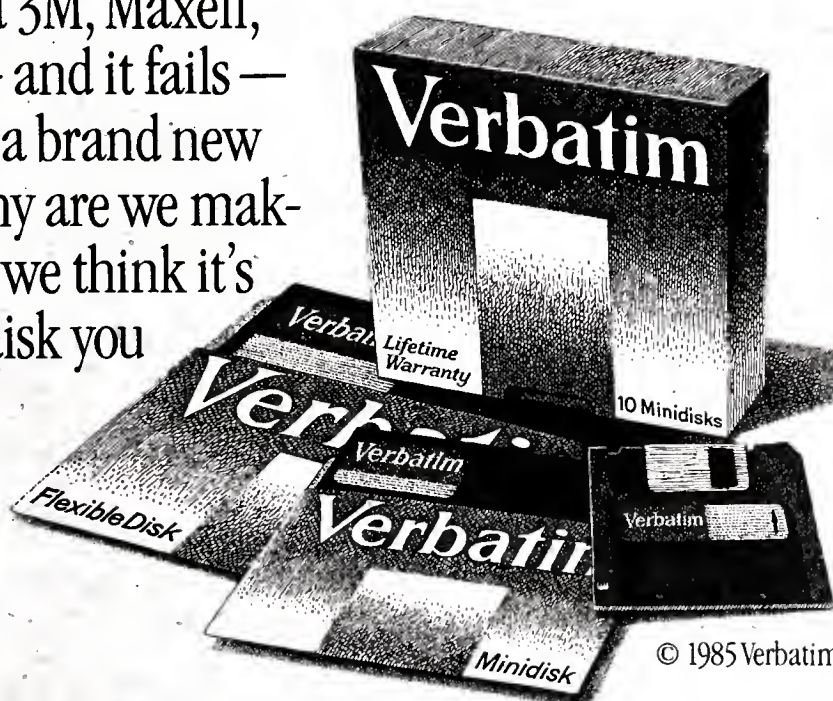
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IN DEPTH/PICKING A CADD SYSTEM

flexible, their modification often requires professional programmers; turnkey systems were designed to be customized by nonprogrammer engineering users.

Purchase alternatives

Users can select a software package, then buy a computer to run it. Making sure of compatibility, they may choose graphics workstations and output devices. A local-area network could be added, completing the customization of the Cadd system.

This strategy would make it possible to take advantage of the highly competitive pricing in high-technology markets while acquiring components suited to your needs. The only catch is that the user has to make everything work together, and the components are so complex that they must be made to work together.

”
Some companies have strong computer departments that can undertake support of a multivendor system; most do not and do not want to build them.

This problem can be avoided by securing the services of a systems integrator — a service firm that helps select the equipment and software, negotiates with the suppliers, performs the integration and leaves the user with the apparent equivalent of a customized turnkey system — and potentially, the seeds of a major disaster.

Here's the problem: Independent vendors of hardware and software will often assure customers that

their products will work together, and they rarely lie about it. At the time the assurance is given, their statements are usually valid.

However, software — and to a lesser degree, hardware — changes. The supplier provides periodic updates to the original product. Because business relationships are dynamic, products often cease to be compatible with each other. The hapless user is then faced with keeping the older products and eschewing

updates (an intolerable condition in a society in which everything must improve periodically) or paying for the expensive expertise required to maintain compatibility among the latest version of the products.

Some companies have strong computer departments that can undertake support of a multivendor system; most do not and do not want to build them. These organizations find turnkey systems to be the only way they can acquire Cadd.

Data management issues

Because most turnkeys are configured as a computer with semi-independent workstations, growing beyond the number of workstations that the computer can support with adequate responsiveness generally forces the user to acquire an additional computer. (Decentralized systems, such as those based on Apollo Computer, Inc.'s Apollo, don't have this problem).

In the past, the number of workstations was usually between four and eight. With the current batch of superminis (Digital Equipment Corp.'s VAX-11/785, Data General Corp.'s MV/10000, IBM's 4361, Prime Computer, Inc.'s 950 and others), that limit has risen to about 16.

However, there is almost always such a limit — and when it is reached, another computer and contingent of peripherals must be acquired. Sharing a large engineering data base under a multicomputer arrangement is complicated, because many of the aids available in a single-computer situation must be emulated through procedures. For example, most operating systems will not permit two files to have the same name; when two systems are used, few of the networking arrangements in use today can exert such constraints.

While similar difficulties occur with nonturnkey Cadd systems on small computers, vendors of such software generally allow the packages to be used on a broader range of computers than do the turnkey vendors. For example, Matra Datavision, Inc.'s Euclid can run on VAX systems of all sizes, while Applicon, Inc. (a turnkey vendor) supports only part of the VAX line.

Furthermore, the networking activity itself often adds computational overhead to the system, impairing responsiveness. As networks on chips develop, this problem will diminish.

With a relatively large number of workstations, users often decide to set up a central plotting facility with a full-time plotter operator. Doing so requires the system to support spooling, wherein plot files are placed in a queue along with instructions to the operator. The operator can manage the queue by changing plot priorities and directing output to different plotters. Not all turnkeys support such an arrangement.

The user who wants to expand by acquiring a different type of turnkey is in for some disappointment if he expects to share data between systems from two different vendors. While arrangements exist for transferring data (see box), they are neither fast nor convenient. Only if the data bases of the two systems are to remain separate, with occasional transfers of small numbers of files, can such a configuration work. Turnkey system vendors leave

(Continued on ID/24)

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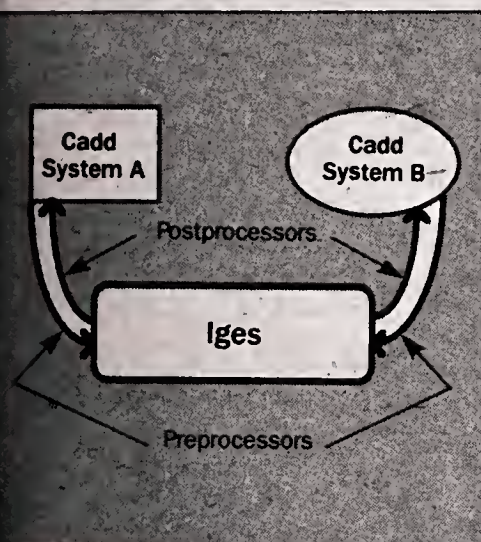
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IN DEPTH/PICKING A CADD SYSTEM

Data transfer between Cadd systems via Iges



Translating data from one Cadd system to another is difficult because representation formats are considered proprietary by the Cadd system vendors. A neutral format called Iges — Initial Graphics Exchange Specification — was developed to deal with this problem. Vendors need only provide translators from their proprietary formats into and out of Iges. File translations can then be effected by converting one system's file into Iges using the translator supplied by that vendor, then converting from Iges into the format of an-

other system, using the second system's Iges translator.

Translation via Iges takes, at best, several minutes for an average engineering drawing. Extensive editing of the converted drawing can add hours to the translation process. In many cases, entering the drawing into the new system by hand might be more cost-effective.

Iges is the product of a committee founded by General Electric Co., Boeing and the National Bureau of Standards.

Almost all Iges post-processors

(translators out of Iges) work well. Many vendors, however, have produced poor preprocessors (translators into Iges), because they don't want to make it easy for customers to convert their data for use on other systems. Consequently, service bureaus have sprung up to meet the need for thorough data conversion.

Iges makes it possible to convert drawings from one system to another, but it doesn't make it easy. Information is available from NBS, Building 220, Room A353, Gaithersburg, Md. 20899.

Designing and drafting

Computer-aided design and drafting (Cadd) is a phrase that glues together two terms of very different scope. Drafting is the producing of drawings; design is the ordering of intentions. Drafting is the most common way of giving form to designs, much as typing is the most common way of giving form to writing.

All Cadd systems have certain components in common: a computer; a workstation with a graphics display and an input device; a graphics output device; and Cadd software. They range in size from desktop personal computers to the largest of mainframes, supporting hundreds of workstations.

They can be centralized, like the IBM/Cadarn system; decentralized, like the Auto-Trol/Apollo system; or a bit of both, like the Intergraph system. Prices range from \$7,200 for a tiny Robographics turnkey, complete with plotter, to millions of dollars for a large Control Data Corp. Icem system with dozens of workstations.

Most Cadd systems are not used for other functions; doing so would negatively affect workstation response time, which is one of the most important ergonomic characteristics of a Cadd system.

Computer-aided drafting is easy to cost-justify because drafting has a well-defined and measurable product. The benefits of computer-aided design, on the other hand, must be taken largely on faith. Small wonder, then, that most of the 15,000 Cadd systems in use are made to function as drafting machines and that designers seldom use them.

Drafting systems for most engineering disciplines are similar; they must all permit the rapid production of drawings. Electronic, mechanical and architectural drafting demand lines and curves, text and symbols, panning and zooming and so on — but to varying degrees.

Design systems are applications oriented: Schematic capture systems must preserve topological continuity but have little use for shaded areas; mechanical design must have 3-D, which is of little use to the creator of integrated circuits. It is also helpful for design systems to interface to application-specific analysis programs that are seldom marketed by the Cadd system vendor.

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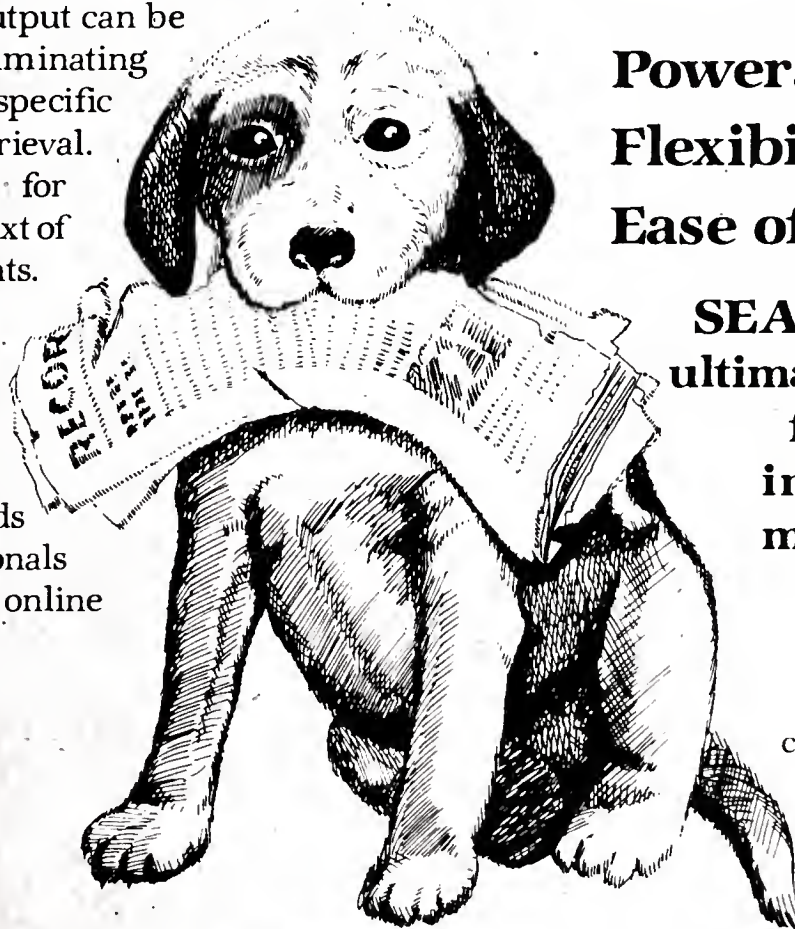
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IN DEPTH/PICKING A CADD SYSTEM

Pros and cons of leading turnkey Cadd systems

Selecting a turnkey Cadd system is a difficult and lengthy process. Describing the user's needs in functional terms is the hardest part. The functional specification makes it relatively easy to narrow down the choices so that final selection can be based on issues other than functional ones — for example, price and delivery.

The fact of the matter is that there is no best turnkey Cadd system or vendor; all the leading ones have pros and cons.

Here are some opinions on the best-selling systems:

IBM. While technically not a turnkey vendor (IBM sells its computers and workstations with third-party software — Cadam, Catia, Caeds and Cbds2), the largest computer company is also the largest Cadd vendor.

IBM has good computers, nice displays, excellent service, software that is poor in features compared with the other leading systems and intriguing plans for networking personal computers, 4300s and so on.

Computervision Corp. The largest Cadd-only company has undergone a transformation in the last two years from "aging leader with dying product line" to "dynamic mini-conglomerate."

An almost miraculous transition to using other people's hardware (Sun Microsystems, IBM) and software (CIS, OIR and others) has given this company a new vitality and a convincing sales story.

One concern is that a full-blown system involves hardware and operating systems from Computervision, Sun and IBM — a cumbersome mix. It is not a good "casual use" system; but it is strong across a wide range of applications, such as electronics, mechanical engineering and now architecture engineering and construction.

Intergraph Corp. This leader in mapping and architectural Cadd has become a major contender in the mechanical and electronic Cadd markets.

A well-integrated mix of Digital Equipment Corp. computers and Intergraph workstations and other devices (file processor, graphics processor and so on) presents a uniform personality to the user.

Intergraph features the best graphics. Ease of learning makes for a reasonable casual use system.

GE Calma Co. This company offers a range of products in all Cadd disciplines. After a rocky transition to General Electric ownership, a coherent product line and strategy are expected to emerge.

Calma has a reputation for excellent software but inconsistent responsiveness. GE ownership was expected to improve that situation, but those hopes have been only partially fulfilled. GE's determination that Calma spearhead its CIM efforts is sure to make a difference in the long run.

Applicon, Inc. The first turnkey Cadd vendor with raster displays was one of the last to take full advantage of them. The Bravo system had the makings of the first truly integrated CAD/CAM turnkey, but its introduction was long delayed and fraught with problems. Applicon's strengths are its integrated circuit design and mechanical design (especially solids).

Applicon lost much of its Bravo-given momentum when the product took a long time to live up to specifications. The departure of President Don Feddersen several months ago to pursue venture capital interests hurt the company's image in terms of stability.

The early performance limitation of Bravo gave it a bad reputation. Today, the system is a viable contender in terms of function and should help maintain the company's leading position.

McDonnell Douglas Automation Co. (McAuto) This aerospace company bought the firm that produced Unigraphics years ago and has nurtured it into one of the main Cadd systems on the market today. Lack of integration with solids and poor workstation ergonomics have recently been remedied. Interestingly, Unigraphics II (the current product) is available on DEC, IBM and Data General Corp. processors.

An unrelated system, BDS/GDS, is offered by McAuto on Prime Computer, Inc. and DEC processors in the architecture engineering and construction market.

Easy to learn, Unigraphics II is

one of the best injection mold Cadd systems. The broad range of processor and display options is very convenient for customizing a system.

BDS/GDS on the Microvax with Tektronix, Inc. terminals is a high-power, low-cost system, which should prove attractive to medium- and large-size architectural firms.

Control Data Corp. Even more than IBM, CDC offers a broad range of Cadd systems and terminals. Systems range from micro-based electronic Cadd units for schematic capture, to very large configurations supporting dozens of terminals that function as complete mechanical design and manufacturing systems. CDC has an attractive data management/human interface regulating program called Engineering Data Library.

The company offers a broad range of services, including consulting, time-sharing, education and financing. The system is powerful but not easy to learn.

Auto-trol Technology Corp. This company sells two separate software packages (Series 5000 and 7000), corresponding to architectural Cadd and mechanical Cadd/CAM. Auto-trol was the first firm with a truly distributed system based on the

Apollo computer network. Auto-trol's software also runs on the DEC VAX.

Having experienced a difficult time in business two to three years ago and changes in management, the company is now profitable and back on track in terms of growth. The architectural product is interesting, but the mechanical product is exceptional.

Ease of use and the network concept make this system one of the best for casual use.

Others systems include the following:

■ **California Computer Products, Inc.** — interesting architectural system.

■ **Gerber Systems Technology, Inc.** — good five-axis machining.

■ **Graftek/Burroughs Corp.** — nicely integrated with solids and CAM.

■ **Mentor, Daisy, Valid Logic** — the leading integrated-circuit design systems.

■ **Matra Datavision's Euclid** — elegant solids, good CAM, great user programming language.

For low cost, Micro-Installation's packaging of Autocad with an NEC Corp. micro, sold as a turnkey, is an excellent buy.

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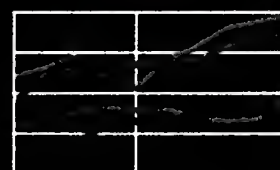
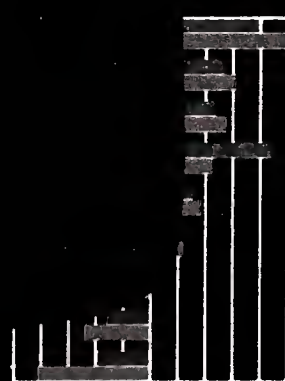
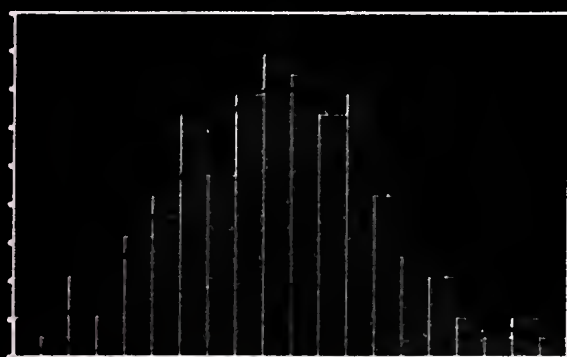
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IN DEPTH/PICKING A CADD SYSTEM

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While many vendors pay lip service to the concept, there are no working examples of complete CIM implementation and only a handful of partially operative CIM installations.

(Continued from ID/20)
prospects with the impression that all required training is vendor supplied. In fact, vendors do supply all the user needs to know about operating the turnkey system — but this is only a portion of the knowledge required to use the system effectively.

The onus is on the user to determine exactly how the system is to be integrated into the organization's operations. Once standards and

procedures for the automated operation are developed, they must be used to develop a training course that integrates systems knowledge with procedures. Doing this properly yields substantial benefits; most users discover the need on their own, however, after much time has been wasted, because few of the vendors make the need clear.

For the most part, turnkey Cadd system vendors sell tools for the automation of

existing engineering activities — principally, the creation of drawings. But drawings are out of place in computer-integrated manufacturing (CIM). In CIM, three-dimensional models are the basis for integrating manufacturing functions; they cannot be derived from drawings. Because of user reluctance to plunge into three-dimensional design, vendors have developed many demonstrable but untried modeling system features.

Another cause of vendor reluctance is that CIM will demand customization, and turnkey vendors are not sure they can make money selling such services along with their products.

As a result, turnkey Cadd at large is not ready for CIM — but then, neither are most users. CIM requires a commitment to sweeping organizational changes that few users are prepared to consider. So while many vendors pay lip service to the concept, there are no working examples of complete CIM implementation and only a handful of partially operative CIM installations.

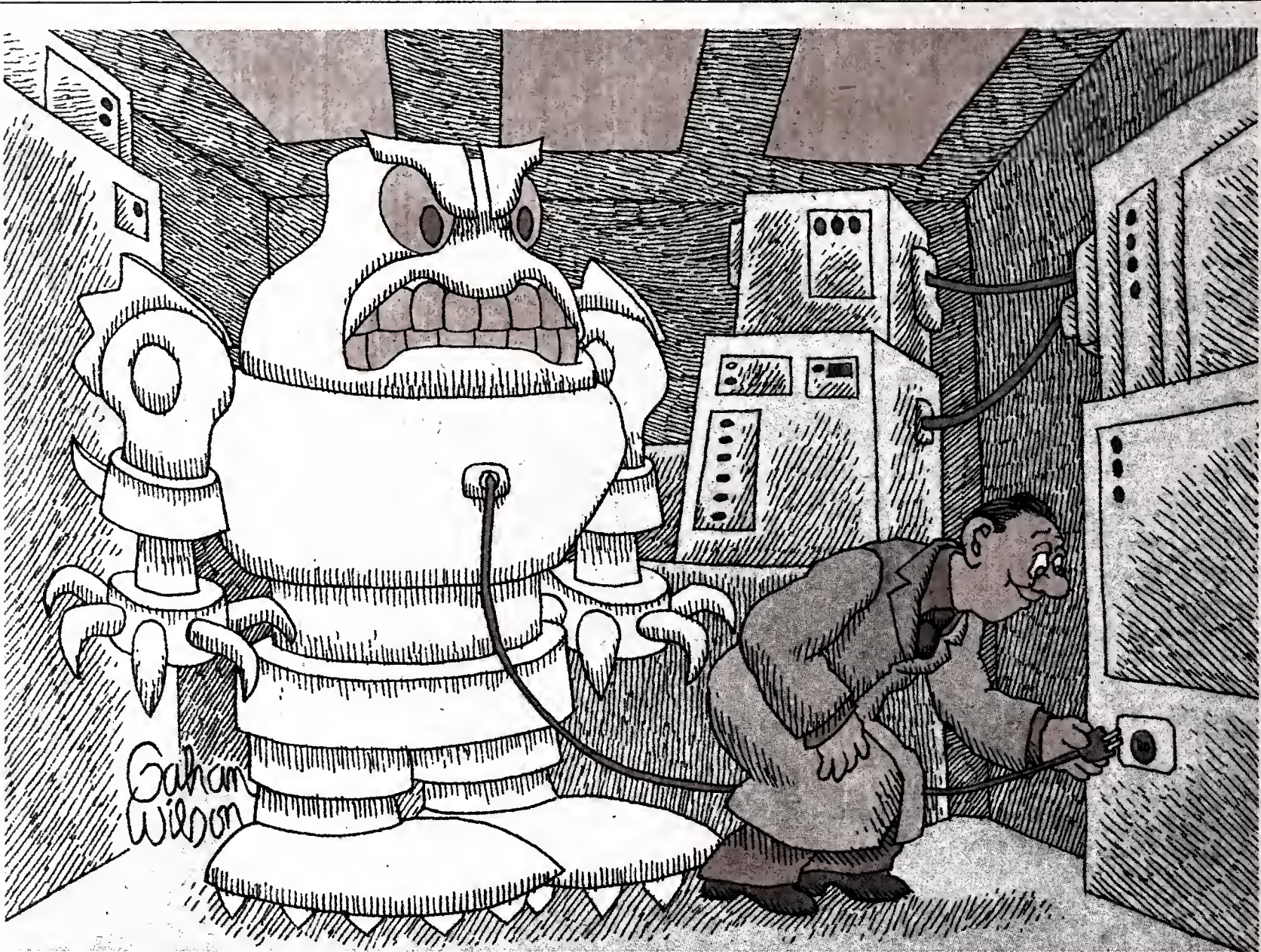
The demands of users for highly responsive Cadd workstations, coupled with the availability of low-cost, high-power computers, will surely lead to a proliferation of networks of powerful independent workstations as the dominant Cadd turnkey configuration. The growth in the average size of such networks is already forcing vendors and users alike to pay more attention to the data base issues.

The greatest obstacle to progress toward CIM is traditionalism. "We've always done it this way [whisper] and we are frightened by the implications of automation!" is the credo of many manufacturers. Technology is available today to make vast improvements. To take advantage of it, manufacturers must face the organizational and social issues squarely. Turnkey system vendors can help but cannot lead.

Buying a turnkey system relieves the user of many integration problems. But a turnkey is not a panacea; the user must still invest heavily in planning, training and customizing. The difference in cost between turnkeys and home-assembled systems is worth it for most users. Let the user remember that the success of the installation is not the responsibility of the vendor. Caveat emptor.

About the author

Joel Orr, a speaker and author on graphics, heads Orr Associates, Inc., an industrial automation consulting firm in Danbury, Conn. He is a founder of the National Computer Graphics Association and director of the Cadd/CAM Institute in Danbury.



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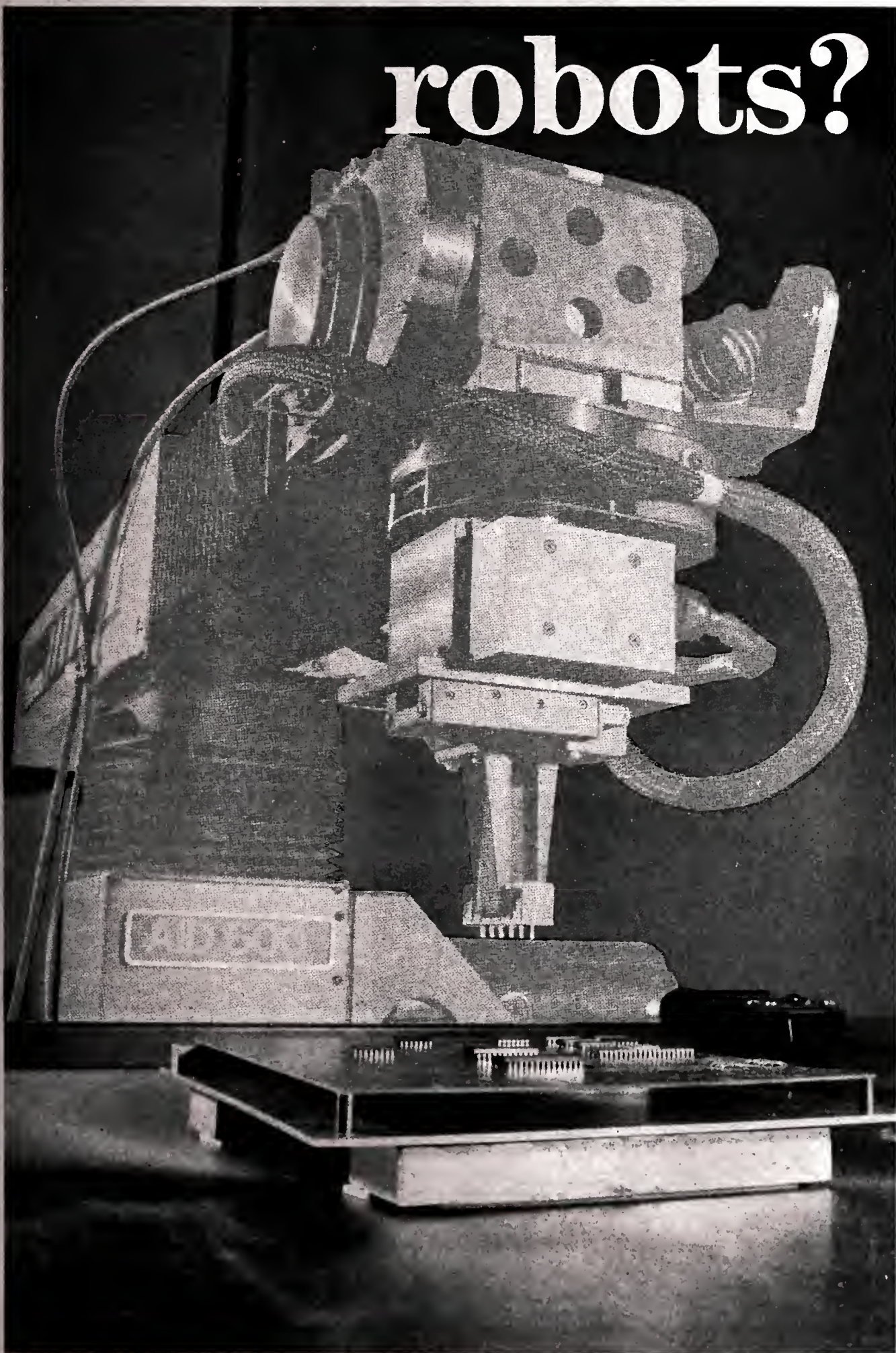
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IN DEPTH

Where are the robots?



By R. C. Reeve

Five years ago, the drums of the robot revolution were beating feverishly. Predictions eclipsed predictions in projecting a new world of robots. Where is that revolution today? Are the robots still coming? And how will they impact data processing from the factory?

The Japanese dominate the world in installed robots. The Robot Industries Association recently reported the 1983 robot population in Japan at 41,000, in Europe at 13,000 and in the U.S. at 9,000.

Japan is employing more than four times the number of robots as the U.S. This statistic is even more alarming when factored by the relative size of the respective manufacturing economies. Some choose to disagree with the accuracy of these estimates based on differences in definitions of robots. However, the bottom line is that there are more robots in Japan than anywhere else in the world, and even Europe is ahead of the U.S.

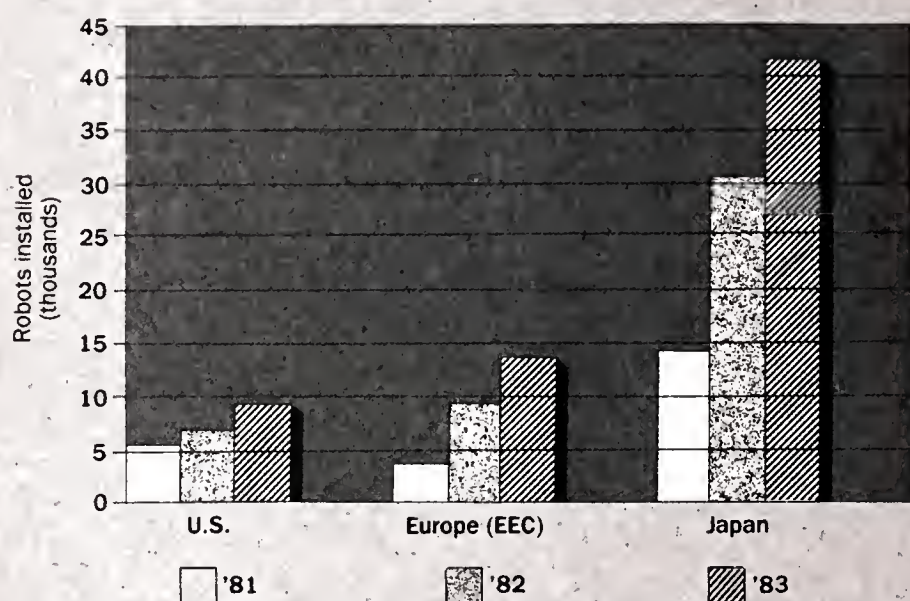
It is little comfort that the robot revolution is safe and secure in Japan and Europe, because this technology has the potential to be the most human-felt ingredient of the computer age. Why is U.S. industry desperately lagging in installed robots? Will this create a robot technology gap?

The answer to the great disparity between the number of robots in Japan and the U.S. appears to be too simple. The Japanese want to use robots! Americans seem to be more interested in robot technology than in using robots in production.

This attitudinal difference may be linked to America's feelings about manufacturing. Manufacturing fell out of vogue in the U.S. about 30

IN DEPTH/ROBOTS

World robot population



years ago. American business fortunes are currently made through high technology, service, banking, finance and the information revolution.

Manufacturing remains behind the scenes. Everyone knows it's there, but no one wants to take responsibility. After all, what type of cocktail chatter would setting a new record in reducing quality defects make? Nothing exciting here. Henry Ford stories are passe.

Commitment to quality

The Japanese are totally committed to manufacturing. They have pursued a national goal of quality in manufactured goods for the past 30 years. When capital investment decisions are based upon a need for quality vs. a saving in labor costs, different conclusions are reached. Robot

justifications based on quality requirements are more economical and viable than those based solely upon labor savings. The problems facing U.S. manufacturers today are the result of 30 years of neglect.

The U.S. was once the greatest manufacturing nation on earth. The size and prosperity of the American market invited large investments in dedicated automation for high-volume products such as automobiles and appliances.

But as America's basic needs for shelter, food and transportation were fulfilled, consumers turned to specialized products to satisfy their personal tastes.

During the 1960s and early '70s, the Europeans, who were experts in producing quality products for low-volume markets, captured a significant share of the U.S. market. With the strong U.S. dollar in their hands, eager consumers scooped up these high-quality European products. During the '70s and '80s, the Japanese came with variety, quality and price — far too much for the American consumer to resist.

The battle for today's consumer's dollar is being won by perfecting the manufacturing process. Automation and quality control are the battle cries of new-wave manufacturing. U.S. manufacturers continue to retreat to the high ground of volume products, clever advertising, promotions and balance sheet restructuring through consolidation and depreciation of obsolete manufacturing capacity.

But today, the effectiveness of clever marketing and innovative financing are passing. Japanese manufacturers have demonstrated their ability to produce moderate volume products with quality at low cost through automation. American manufacturers are now faced with survival decisions, but they lack the trained manufacturing personnel to repair the leaky boat.

U.S. manufacturers have been slow to implement robotics because of a lack of trained industrial and manufacturing engineers. As manufacturing fell out of vogue, manufacturing managers became less visible and took less risk. Managerial and financial support for innovation decreased. And as the current generation of manufacturing managers approaches retirement, there is even less incentive to take risk. Precious few young trained managers are available to assume command.

High-tech phobia

How do current manufacturing managers hold the aggressive venture-capital-fueled robot industry at bay? Simply by demanding better technology and more risk-taking from robot vendors.

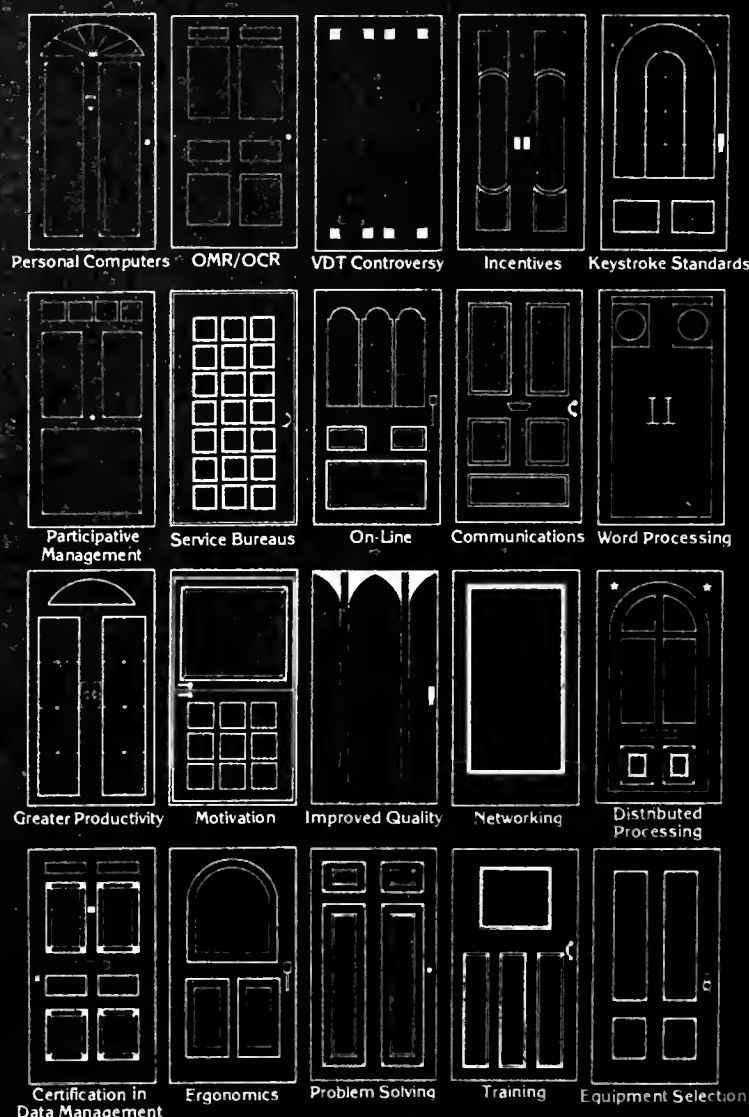
"If your robot could only..." are the famous words that strike terror in the heart of a robot salesman. "If robots could only see, think, hear, sense [pick any appropriate word], then we could install them without any trouble!"

And just when the hapless robot company brings out the ultimate robot product, the other shoe drops. "It's far too expensive to justify even at the cost of our labor," or "It's too complicated with all those features... how will we ever keep it running?"

The bottom line is that U.S. manufacturing management doesn't want to install robots.

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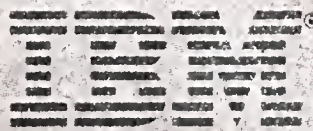
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IN DEPTH/ROBOTS

The U.S. is the home of stand-alone robot companies, companies that have invested millions of dollars in the advancement of robot technology. This technology will benefit the next generation of robots, providing sensors, vision, hearing, touch and intelligence. Most of these companies are forced to continue to invest heavily in research and development, but none of them are able to show the profits necessary to attract much needed new capital investment.

In contrast, Japan and Europe do not have many stand-alone robot companies that must make strong profits to survive. The successful producers of robots there are companies that have developed robots for internal use or to exploit their basic products.

In Japan, a leading robot maker,

Yaskawa, developed robots that use their electric motor and ball-screw products. Kawasaki licensed robot designs from Unimation (the American company that originated the robot) to manufacture their motorcycles and automobiles. Others, such as Hitachi Ltd., Nachi-Fujikoshi and Mitsubishi Electric Corp., manufacture robots that complement their existing automation products.

In Europe, Asea and Trallfa have developed robots to expand specific market segments they were already serving. Kuka, a German manufacturer of automation for the automobile industry, originally imported robots from Nachi-Fujikoshi of Japan but has since developed its own robots in conjunction with Siemens. Volkswagen developed robots for automobile manufacture. Renault of France also developed robots for its

own use in automotive manufacture.

The need for robots is evident. Venture capitalists and investors have been willing to invest millions in robotics technology. There is no question that the robot revolution will happen in the U.S. — the only question is when.

Most successful U.S. robot installations have been initiated by senior management with the clout, financing and follow-through to make the technology stick. Currently, the largest installed base of robots is in the automobile industry. The robot revolution there is driven by the automobile industry's determination to survive. Some suppliers to the automobile industry have also taken the initiative and are robotizing.

The electronics industry is the newest robot growth market. Robots are used for printed circuit board

What is a robot?

Definitions of robots are as varied as the motives of their promoters. In its most liberal usage, the word "robot" is used to convey a type of automation that replaces human presence. Hence, even simple mechanical devices that execute functions heretofore performed by humans can be called a robot.

For most people, a robot is perceived as a human analog, an electromechanical marvel with some type of human form and function. Robots are assumed to have computer brains, the ability to mimic certain human actions and sometimes the ability to reason or display intelligence. At its ultimate, the robot is a servant to humans, able to do its master's bidding on command.

The most common industrial robots sold today are mechanical devices with five or six axes of motion. These motion axes are powered usually by electric motors, although hydraulic and air power are also used, depending upon the speed, power and accuracy required by the application.

There are a wide variety of sizes and shapes of robots, each designed with a particular use or function in mind. The four basic geometries of robots are: rectilinear, cylindrical, spherical and anthropomorphic. These geometries refer to the types of motions provided by the three primary positioning axes.

The rectilinear geometry features three linear motions, all usually orthogonal to each other. This geometry has a working volume that resembles a box.

The cylindrical geometry has two linear motions, usually orthogonal, mounted on top of a rotary motion. It has a working volume that resembles a cylinder.

The spherical robot geometry usually combines two rotary motions, typically orthogonal to each other, with one linear motion. The working volume of this geometry resembles part of a sphere.

The anthropomorphic geometry is similar to the geometry of a human being. It combines three rotary motions, two of which are in the same plane with each other and both are orthogonal to the first rotary motion.

The three axes perform the same function in all geometries. The primary axes allow the robot to reach a position in space. A second set of two or three axes are used to position a tool or instrument at that point in space. This set of axes is called the robot wrist. Three somewhat orthogonal rotary axes are usually required to allow positioning from any angle to a point in space, but two axes may suffice if the tool being used has a circular plane of use.

One fairly well-accepted robot definition is: "an easily reprogrammable, computer-controlled device that can physically manipulate its surroundings." The size, shape and number of axes of a robot are not material to its definition, only to its function.

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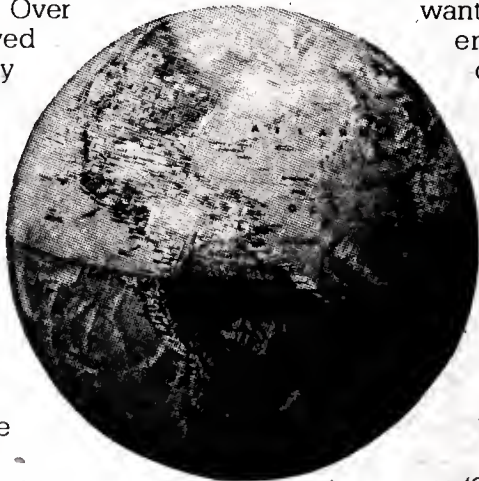
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handling, disk drive assembly and clean room tasks. Robots used to assemble disk drives reduce the problems of contamination. Robots can also transfer printed circuit boards to and from workstations, into test machines and into automatic insertion stations. GMF Robotics of Warren, Mich., recently promoted a standard robot that could meet clean room requirements. Others have routed similar capabilities.

Separate paths

Robots and vision have been traditionally considered the same market segment. Now vision is receiving the same independent attention and promotion that robots received five years ago, creating a new independent market. Experts are predicting a billion-dollar vision market by 1990.

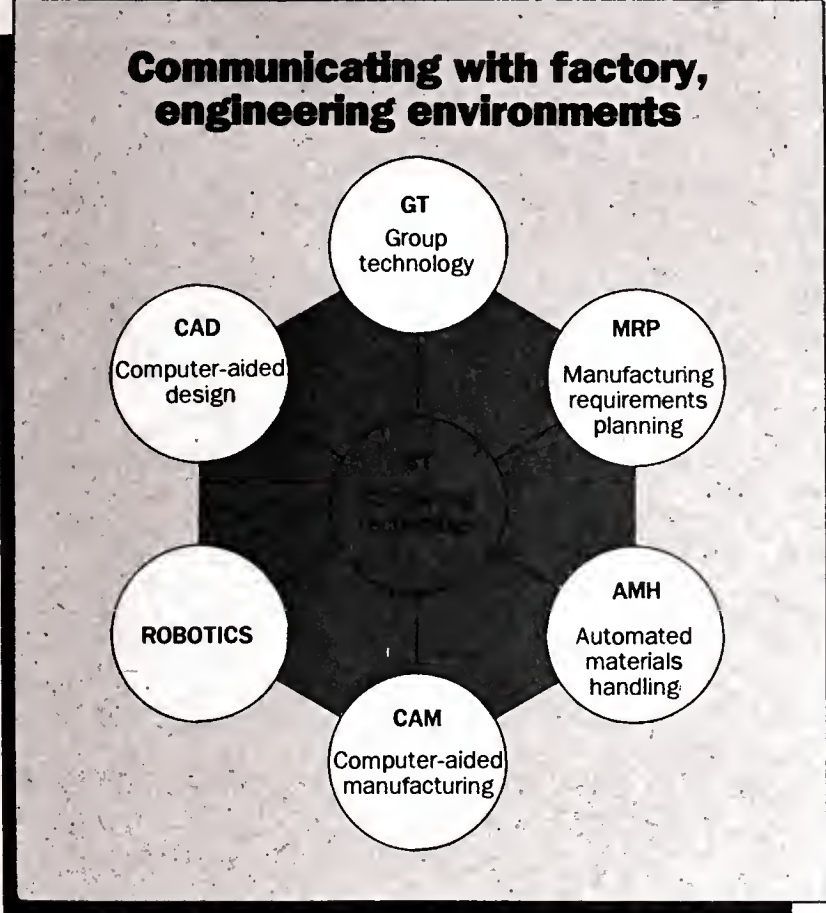
In addition to vision, tactile sense is another critical feedback that many believe robots must acquire to perform manufacturing tasks. Sensors are incorporated into robot grippers and tools to enable the robot to determine the object location or to adjust the force applied by the robot.

Use of robot transporters is also growing. These robots are like motorized carts and follow buried wires or trans-

mitters strategically located along travel paths. Transport robots can be programmed to move materials in the factory between workstations and to and from inventory areas. In manufacturing, the robot transporter can augment or replace the forklift truck. In assembly, robot transporters can replace conveyors to move trays of parts and subassemblies to individual workstations.

The off-line programming of robots is still used primarily to study and simulate robot motion. Little progress has been made in expanding off-line programming's role to the rapid changeover of robot tasks or to increase the efficiency of programming. This delay has been in part because of the mechanical inaccuracies of robots and the unpredictability of their work environments. In the future, off-line programming is expected to be a standard feature of most robots.

The McDonnell Douglas Automation Co. (McAuto) group developed software tools for off-line programming of robots. McDonnell Douglas developed the Air Force's APL-based Robot Programming Language. And in an independent development, McDonnell Douglas introduced Place, a robot soft-



ware simulation product used to simulate robot work cell set-up and evaluation. Place supports the geometrics of many of the current robot models.

The Japanese are not far behind in the high-tech robot race. Their success in implementing less sophisticated robots has fueled their sales, providing the income necessary to pay for new R&D.

In addition, the growing Japanese user base has increased their knowledge of robot applications technology, providing new and more cost-effective solutions to robot problems. Japanese manufacturers may already lead in robot product development. Advanced Japanese research is demonstrating robots that can walk, touch, feel, hold and even play.

Mainframe computers will be called upon to support robotics, and off-line programming may be one of the first areas. User data bases for specific robot geometrics, work-cell environments and associated machinery specifics will have to be maintained and updated routinely. Robot programmers will need to access CAD/CAM data bases for parts definitions, work-cell layout and tooling configurations.

The eventual efficiency and productivity of robots will depend upon their ability to communicate with the total factory and engineering environments. Just how these linkages will be made and the role of data processing in their implementation and execution remain to be defined (see figure).

To date, data processing has managed a large portion of the computer revolution. It has provided industry, government and education with billions of miles of printouts and uncountable pieces of information. What role will data processing play in the robot revolution? Stated another way, how will the robot revolution affect the data processing department?

One common definition of robots (see box on left) — "an easily reprogrammable,



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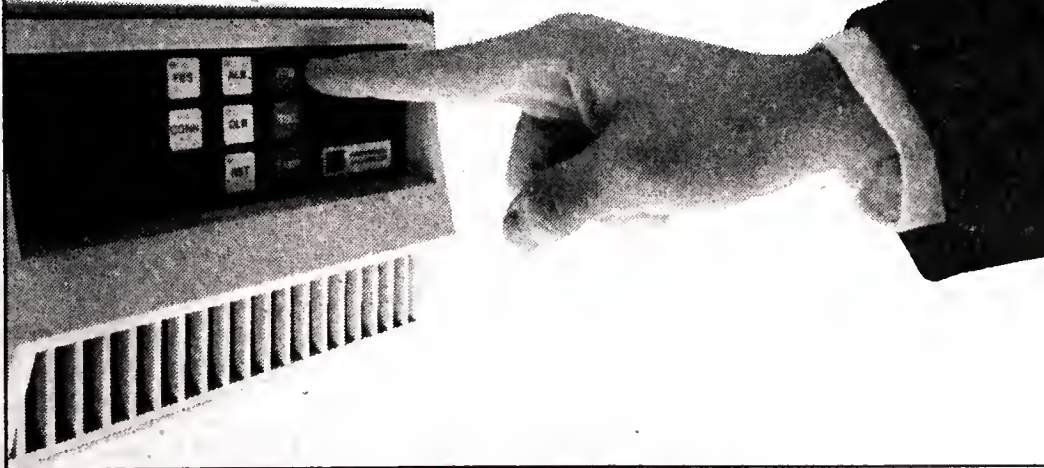
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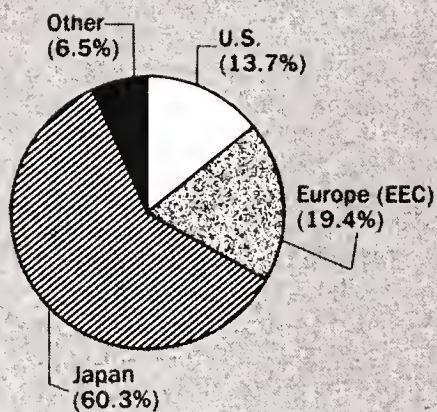
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IN DEPTH/ROBOTS

World robot population 1983



computer-controlled device that can physically manipulate its surroundings" — points out an important new idea. The robot is a means for the computer to *interact* with the physical world. Up until now, the computer has been providing *information* to humans via CRTs and the printed page. If humans were not there to use the information, computers would provide little impact on our world.

But robots provide a means for computers to perform physical functions in the real world. And because robots are run by computers and computers can be made to communicate with each other, we can imagine a mainframe computer directing a robot to replace its backup tapes, load fresh paper in its printers, retrieve media from storage and so on.

Data processing professionals

who have chosen to make their livelihood with computers may be among the first to experience robots. The DP world may be one of the first to move from high tech to high touch.

In many ways, robotics has been a part of data processing for years. Devices such as automatic backup units, automatic microfilm systems, form bursters, mailing machines, laser printers and so on could all be considered dedicated robot devices. Not to stretch the definition of a robot, the main point is: "Who is more prepared to accept robotics than those who use the computer for their livelihood?" Perhaps data processing will play a key role in accelerating the acceptance of robots in U.S. manufacturing.

The decline of manufacturing during the past 30 years has created a shortage of skilled persons. Manu-

facturing has failed to attract the brightest stars and to provide them with a forum to display their talents. On the other hand, data processing has attracted many skilled and talented individuals. It has provided incentives and training that have created a significant body of talent with experience in computers and automation concepts. Perhaps DP will be called upon to assist manufacturing in utilizing robots.

One area where data processing may be called upon is in the implementation of statistical quality control. Statistical quality control is a new manufacturing buzzword. It means the collection and evaluation of component quality information as a means to control production quality. This function is often desired in real time. Data processing may be called upon to collect, process and disseminate information collected by robots, sensors and vision systems on the manufacturing floor.

A major obstacle is the lack of a means to communicate with robots and sensors on the shop floor. A great deal of attention is being given to local-area networks, communication protocols and integrated manufacturing. The lack of standards and the lack of understanding of the needs and problems of various groups may slow the process.

The latest buzzword of manufacturing is CIM, computer-integrated manufacturing. This concept has emerged as one means to explain how the various ingredients of the automation picture relate to each other.

Arthur D. Little, Inc. has broken the CIM concept into seven major technologies: computer-aided design (CAD); group technology; manufacturing planning and control system (MP&CS or MRP); automated materials handling; computer-aided manufacturing (CAM); robotics; computer-aided design (CAD) and computer technology. Each of these technology areas interact with others to form the whole CIM environment. CAM and MP&CS (MRP) are the most familiar segments of the seven. Each of these can be implemented on its own without the other supporting units.

However, significant additional productivity improvements should be realized when all elements are linked. Robotics is but one technology sphere, interfacing between CAD and CAM. The center sphere is computer technology, which links all technologies and performs a key function in the overall performance of the network.

At present, U.S. manufacturing appears to be enamored also of the automation of small-lot production. This type of automation is often called Flexible Manufacturing System (FMS). FMS requires sensors and feedback systems that measure and control the quality of the item being manufactured in real time. Much work has been done by the National Bureau of Standards to define the requirements of such systems and demonstrate their feasibility.

About the author

Ron Reeve is an independent consultant in robotics and automation and chief executive officer of Edison Welding Institute, Columbus, Ohio. He is the founder of Advanced Robotics Corp. of Columbus and has been involved with robotics and adaptive controls for 20 years.

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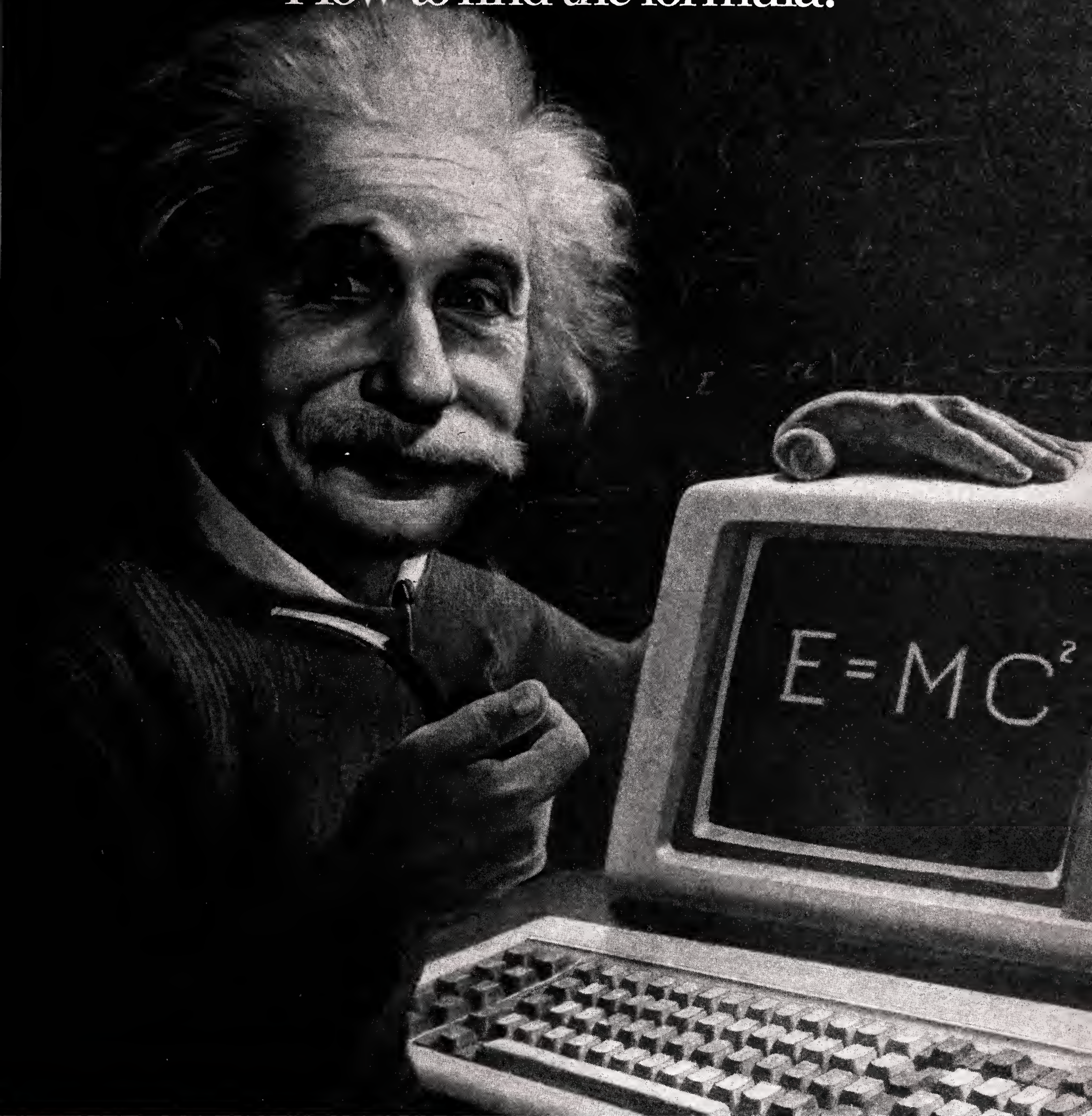
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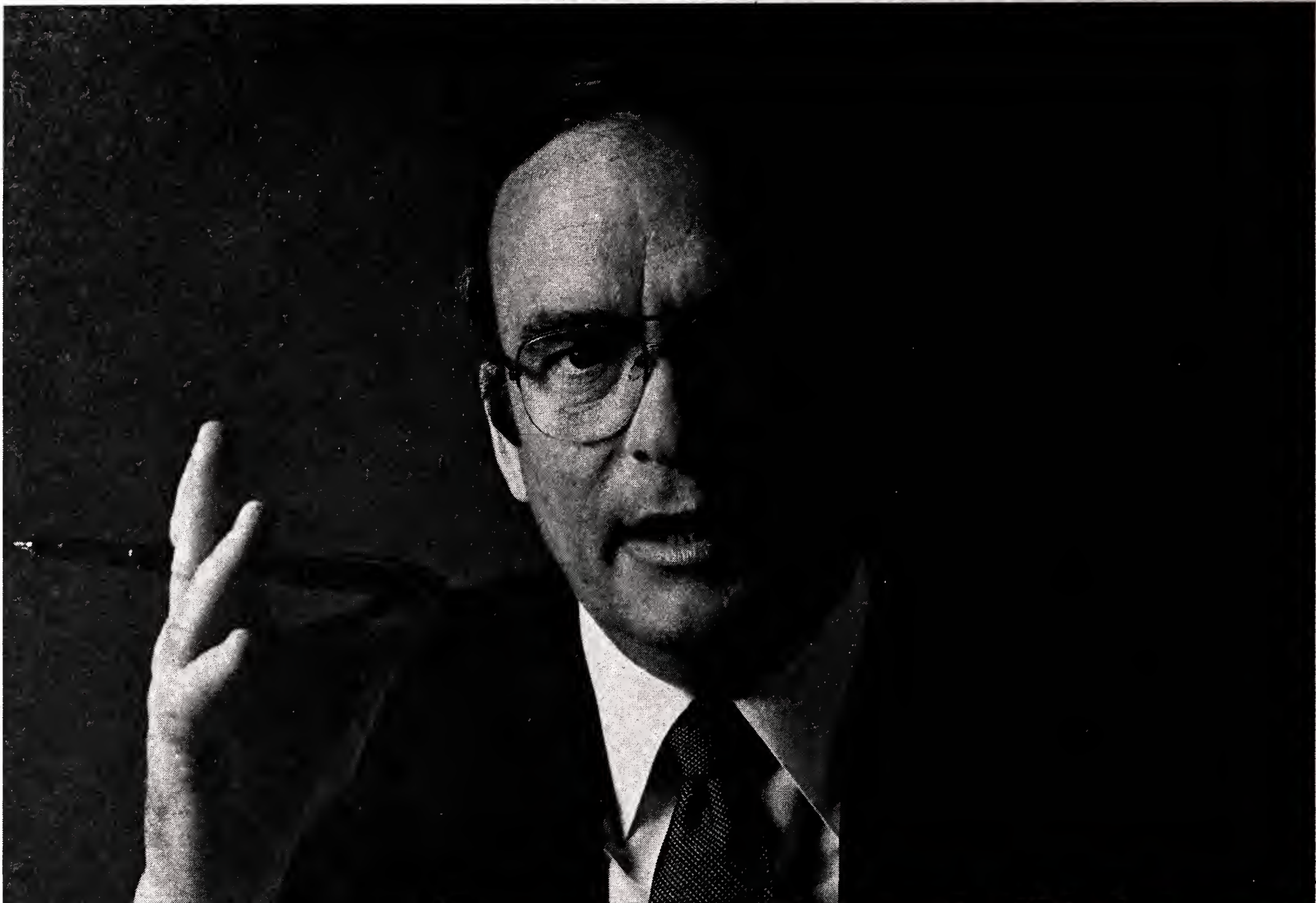
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Extender for 1-2-3 unleashed

SANTA MONICA, Calif. — Software that permits Lotus Development Corp.'s 1-2-3 to address nearly 1M byte of memory on the IBM Personal Computer AT has been introduced by Uniform Software Systems, Inc.

The software, a \$99 program called the Extender, reportedly lets 1-2-3 run in what is known as "protected virtual address mode" on the AT, giving it access to roughly 920K bytes of memory.

Though the Personal Computer AT has the potential to address up to 3M bytes of internal memory, 1-2-3 is currently limited to running within the maximum 640K bytes now addressable under IBM's PC-DOS. A new product from Intel Corp., the \$599 Above Board, reportedly increases that limit by 4M bytes but only after an enhanced version of 1-2-3 becomes available this fall.

The Extender, a one-diskette program, will ship in July and works with existing versions of 1-2-3, according to Uniform Software President Peter Wensberg. The Extender, Wensberg said, could conceivably address more than 920K bytes; the limit is 1-2-3's, not the Extender's, he said.

With the protected virtual-address mode barrier broken, Wensberg said the path is clear for his firm to produce similar extension products for use with such programs as Lotus's Symphony or Ashton-Tate's Framework. The Extender, he argued, will come to serve as a bridge between the world of software for the IBM Personal Computer and the "new world of the [Intel 80286]-based computer" machines.

Uniform Software is located in Suite 514, 225 Santa Monica Blvd., Santa Monica, Calif. 90401.

Keyboard utility programs reduce work, aggravation

By Edward Warner
CW Staff

It may seem like a small matter, but who wants to hit a function key, an End key, the right arrow key and then the Return key when deleting one word from an on-screen document?

Tim Stein, vice-chairman of Forum/Nevison Executive Computing, a Boston-based personal computer training firm, certainly does not. That is one reason, he said, why he uses a keyboard utility program, Alpha Software Corp.'s Keyworks, on his IBM Personal Computer.

Stein, one of the beta users of Keyworks, said he uses the utility primarily to reduce to one or two keystrokes the multiple-keystroke commands required by the integrated software pack-

age he uses, Alpha Software's Electric Desk. For simplicity's sake, Stein converts the commands of Electric Desk's word processor to those used by the word processor with which he is most familiar, Micropro International Corp.'s Wordstar.

Like Stein, an increasing number of personal computer users are turning to keyboard utilities to create macros, which are small programs that reduce to only a few keystrokes a command or function that otherwise would take many. Keyboard utilities also allow keys to be redefined, permitting users to standardize command keystrokes across applications — a feature that, for example, lets "F1" equal BEGIN BLOCK commands in both Lotus Development Corp.'s 1-2-3

See KEYS page 88

Keyworks, Superkey praised

By Edward Warner
CW Staff

Just as it is hard for one to talk about word processors without mentioning Micropro International Corp.'s Wordstar, the beta users of two keyboard utility programs find it hard to discuss the software they tested without mentioning Rossoft's Prokey, one of the first such products and the current market leader.

Both beta users — one of Borland International's Superkey, the other of Alpha Software Corp.'s Keyworks — said they liked their respective packages best for the advantages they offered over Prokey.

Keyworks user Tim Stein, vice-chairman of Boston-based Forum/Nevison Ex-

ecutive Computing, said he used to use Prokey often, particularly to create macros for use with Lotus Development Corp.'s 1-2-3.

"I stopped using [Prokey] because it was so easy to screw up and so hard to change [macro] defines," he said. With Keyworks, he said, creating a macro is more foolproof. A pull-down menu lists Keywork's macro editing functions, while another lists the macros the user has created, he explained. In general, Keyworks "gives much more information about what's going on than Prokey," said Stein, who uses Keyworks to build macros for his word processing software, Alpha Software's Electric Desk.

See BETA page 92



IBM has cut the prices on its PCjr and Portable Personal Computer/79

■ Personal CAD Systems has announced four interfaces for use with its computer-aided engineering software/76

■ Forte Communications has introduced micro-mainframe file transfer software/79

INSIDE

Software/79
Systems/84

Spreadsheet use: High anxiety?



Spreadsheet software has recently been the target of unprecedented attacks in the trade and business press. Perhaps never before has a specific software technology drawn so much critical attention from such leaders as *The New York Times* and *The Wall Street Journal*.

This time the press is right.

It has focused on the growing awareness in corporate America that extensive use of the spreadsheet as the basis for business analysis is fraught with danger. There are countless stories about business analyses that lead to erroneous advice and costly mistakes in organizations.

Published examples include the following:

- An error rate of "at least 20%" among the spreadsheets at a certain New Jersey-based For-

tune 500 company.

- The firing of several oil company executives who recommended an acquisition that was a bad deal; in addition, a Big Eight accounting firm approved an erroneous spreadsheet supporting the recommendation.

The press is interested because there is a groundswell of concern among the millions of spreadsheet users who produce important analyses every day.

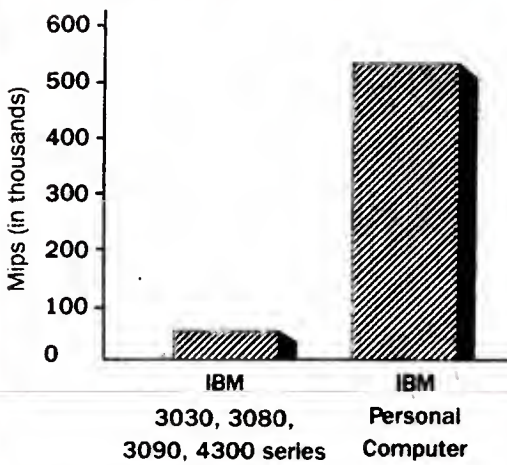
Businesses depend upon numbers but not just any numbers. They need and want numbers that are valid, prepared quickly and easily understood, even when analyses get complex. The press stories highlight what veteran users already know: that the spreadsheet approach fails to meet these needs.

Spreadsheet users are presented with a curtain of numbers that hides all of the reasoning used to arrive at those numbers. The user has to begin the analytic process in a report mode, weave relationships in the report mode, document in the report mode and, finally, report numbers with a very low level of confidence.

Or as Lotus Development Corp. founder Mitchell Kapor said in the November 1984 *Harper's*, "You can just randomly make formulas, all of which depend on each other. And when you look at the final results, you have no way of knowing what the

See ERROR page 92

Total U.S. IBM Mips* installed, 1984



* Million instructions per second
Source: International Data Corp.

Estimated 1984 U.S. computer capacity in million instructions per second (Mips) for IBM mainframes vs. IBM Personal Computers. In presenting the comparison recently, Dave House, vice-president and general manager of Intel Corp.'s Microcomputer Group, noted that because personal computers typically see much less use than mainframes, "the difference in realized Mips is probably not that great."

Firmin, chairman and chief executive officer of Javelin Software Corp. in Cambridge, Mass., has been a research and business applications user for 15 years.

MICROCOMPUTERS

Jazz ships

CAMBRIDGE, Mass. — Lotus Development Corp.'s Jazz, a multi-function applications package for the Apple Computer, Inc. Macintosh 512K, reportedly met its rescheduled May 27 shipping date.

Announced last November, Jazz originally was scheduled for March delivery. The \$595 package includes spreadsheet, graphics, word processing, data base management and communications functions.

Lotus's promotion plan for Jazz includes television advertising, with the first ads on May 27.

P-CAD interfaces out for design transfer

LOS GATOS, Calif. — Personal CAD Systems, Inc. (P-CAD) has announced four interfaces that reportedly allow circuit designs constructed on its Engineering Design Capture software for personal computers running on AT&T's Unix, IBM's PC-DOS and Microsoft Corp.'s MS-DOS to be extracted and transferred to a variety of computer-aided design and computer-aided engineering software packages.

The interface packages reportedly translate the net list, or circuit routing, information from a P-CAD design data base into a format that can be read by systems running Scientific Calculations, Inc. Scicards, the Regents of the University of California's Spice and Motorola, Inc.'s CAD software.

Another interface package is said to translate net list information into an Ascii format, which can then be manipulated into a form readable by other systems.

With the interfaces, P-CAD users reportedly can upload designs to a variety of CAD environments, includ-

ing full fault simulators, physical layout stations and manufacturing control systems, the vendor said.

The Scicards interface reportedly translates three types of schematic components, packing information and net connectivity functions from a P-CAD data base into a format that can be read by the Scicards software.

The Spice interface reportedly allows net list information to be read by Meta Software's Hspice software and includes a symbol library of primitives for creating circuit schematics and element types supported by Spice.

The Motorola interface program is said to translate P-CAD schematic data bases into Logcap, a format compatible with Motorola's semicustom CAD system.

An Ascii program reportedly allows schematic capture or physical layout data bases to be used as source files.

All interfaces are priced at \$500, according to the vendor.

P-CAD is located at 981 University Ave., Los Gatos, Calif. 95030.

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Calif. considers micro buyer protection bill

SACRAMENTO, Calif. — Personal computer advertisements that promise one thing and deliver another could become a thing of the past in California if the California State Assembly enacts a bill under consideration.

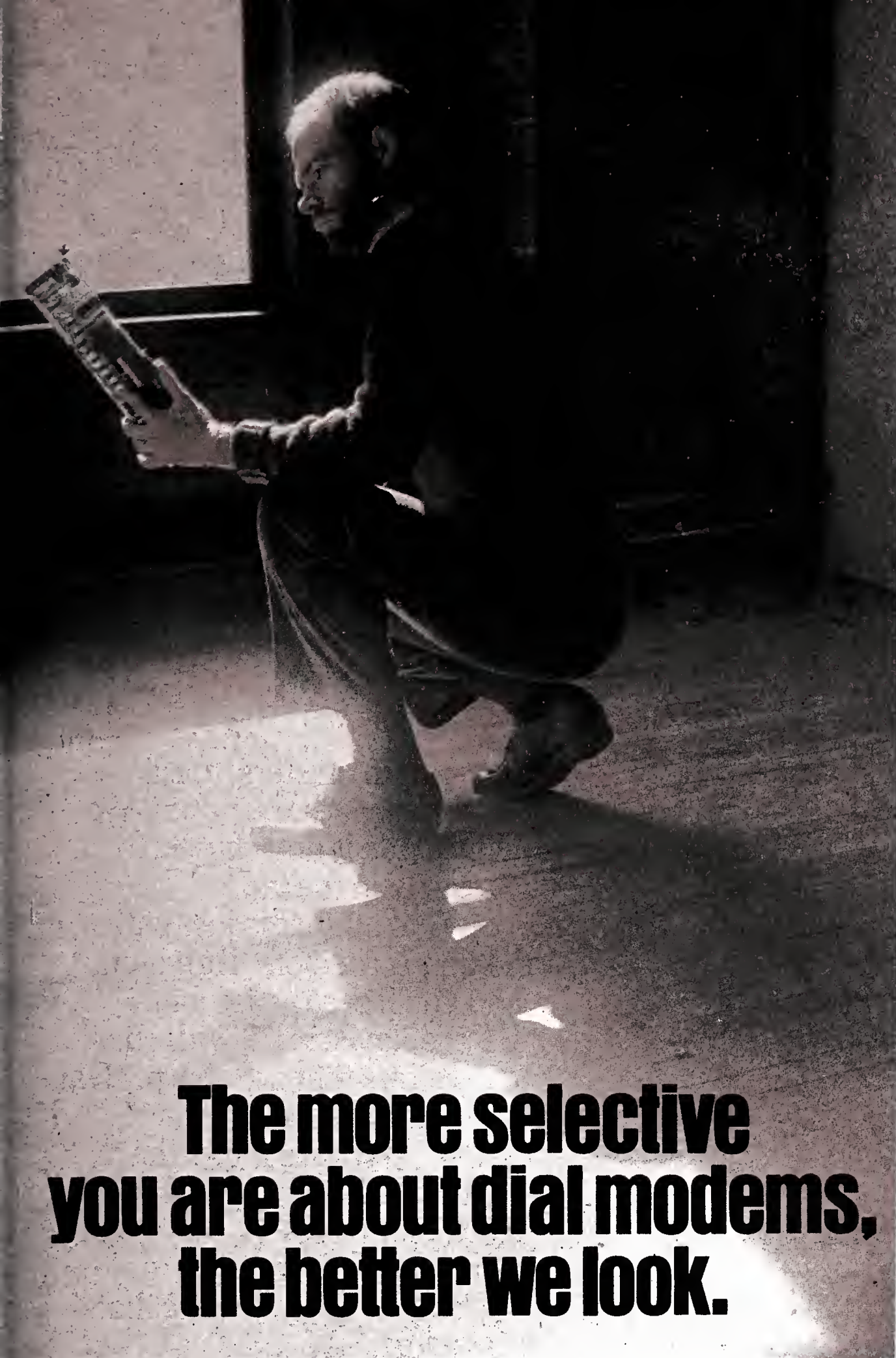
The Computer Buyer's Protection Bill, introduced by State Assemblywoman Gloria Molina of Los Angeles, would make both computer retailers and manufacturers liable to civil suits for breach of warranty should they engage in false advertising of their products. It would not provide criminal penalties, however.

The bill, which would also cover personal computer software and related hardware such as modems, was reported to be out of the assembly's Consumer Protection Committee last month, and a vote by the full assembly, the equivalent of a state house of representatives, is expected shortly.

Molina was inspired to introduce the bill after she purchased an Apple Computer, Inc. Lisa personal computer, according to her legislative aide, Alma Martinez. At that time, Martinez claimed, both the dealer and Apple were promising the addition of a mail-merge feature in the next enhancement of the Apple Lisawrite word processor bundled with the machine. The mail-merge feature was never added, Martinez said.

Apple Computer spokeswoman Rene Rodrigue said she did not know whether Lisawrite had ever been enhanced to offer mail merge but that the Lisa, or Macintosh XL as it is now known, can do mail merge using Key-stroke Data Base software from Brock Software Products, Inc. Rodrigue declined to comment on Apple's reaction to the proposed legislation. Apple has announced that it will cease production of the Macintosh XL this year [CW, May 6].

Since the incident, Molina has "gotten a lot of letters" from people who have said their personal computers had not performed as promised. The bill would make any personal computer product's advertisement or brochure an expressed warranty for the product's performance, she said.



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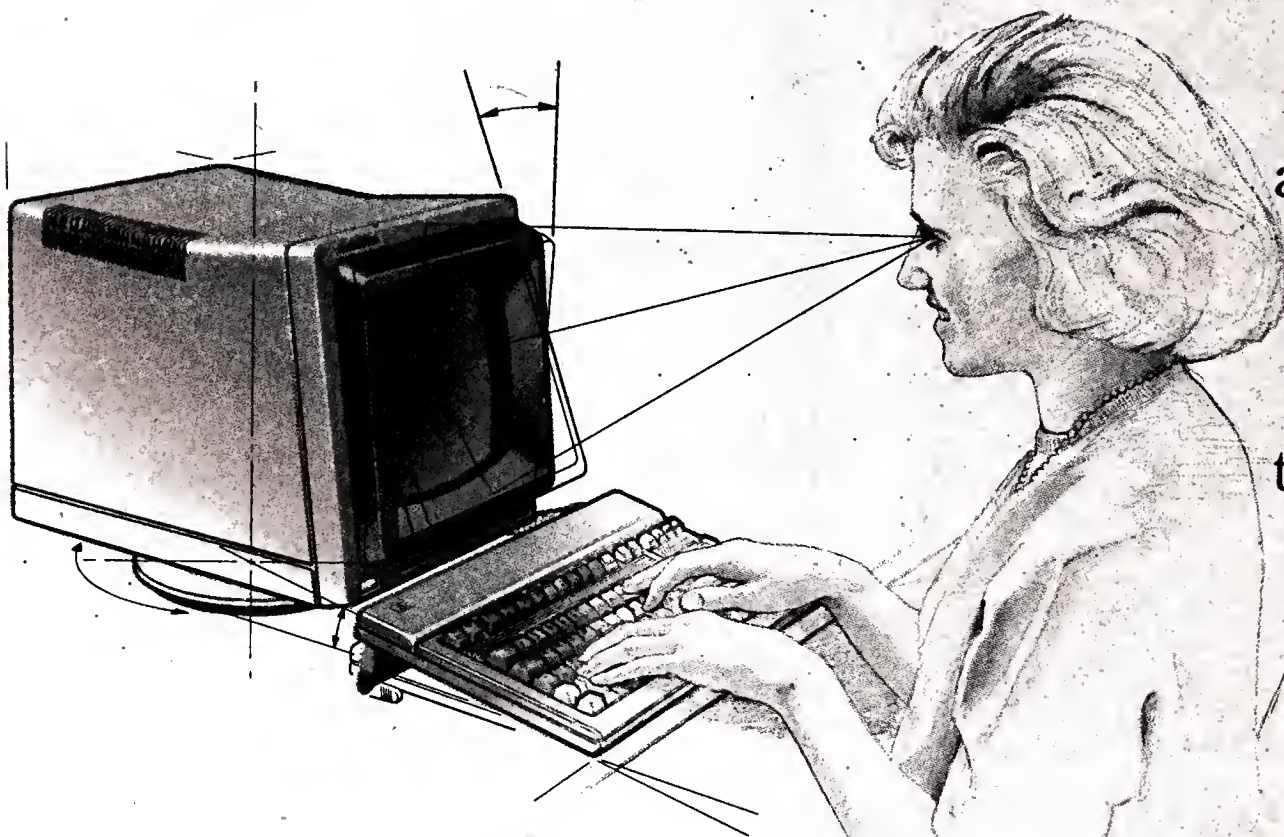
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MICROCOMPUTERS

CDBC adds mainframe link for IBM micros

MINNEAPOLIS — Control Data Business Centers, Inc. (CDBC) has introduced software that reportedly will link the IBM Personal Computer and Personal Computer XT with CDBC's mainframe-based services.

The software, called Orchestrator, will permit a firm to use the Personal Computer to access its data at the CDBC service bureau, according to the vendor.

CDBC provides such services as payroll check processing, and users will be able to download to their Personal Computer data such as payroll tax filing, tax change and benefits information. Users may then manipulate the data using such programs as Lotus Development Corp.'s 1-2-3 and

Ashton-Tate's Dbase II, the vendor said.

No need for mainframe

By relying on the CDBC, a vendor spokesman said, small to mid-size firms can have a data base that can be accessed by all of their Personal Computer users, and they would not need to purchase their own mainframes. Firms with a mainframe in place may elect to have CDBC process their payrolls, a popular feature of the service, according to the spokesman.

Orchestrator reportedly includes a telecommunications program, user security software, four data entry modules, automatic file translation,

backup and restoration programs and printer support software, among other features. It requires IBM's PC-DOS 2.0 or later, 320K bytes of memory, a monochrome or color monitor and an RS-232 serial port.

The software is priced at a one-time license fee of \$3,600 or a monthly fee of \$150. Other pricing options are said to be available. There is a monthly maintenance fee of \$35.

The CDBC service bureau itself sets the prices for its payroll processing service at an average of \$350 a month for a company with 100 employees, and has three pay periods per month.

CDBC is located at 500 W. Putnam, Greenwich, Conn. 06836.

IBM cuts PCjr, portable micro, monitor prices

BOCA RATON, Fla. — IBM cut prices on its Portable Personal Computer, PCjr and PCjr Color Display.

The cost of the Portable Personal Computer with 256K bytes of internal memory and one diskette drive dropped from \$2,595 to \$1,950. The price of a dual-floppy-drive version was reduced from \$2,895 to \$2,250.

A PCjr with 128K bytes of internal memory and one floppy disk drive will cost \$725, down from \$999. The cost of the PCjr color monitor dropped from \$429 to \$399.

File transfer software out for IBM micros

SAN JOSE, Calif. — Forte Communications has announced micro-mainframe file transfer software that is reportedly compatible with IBM's 3270 Personal Computer host file transfer program. The Forte product is said to allow 3270-PC users to upload and download IBM's Professional Office Management System from IBM mainframes.

PJ/FTS comes bundled with Graph/FTS, which reportedly allows users to transfer IBM S3G mainframe graphics files to the 3270-PC.

Forte's PJ/FTS reportedly requires use of the Forte PJ 3278/79 emulation card and, to utilize its graphics functions, the Forte's IBM 3279 S3G graphics emulator card. It also requires IBM's MVS/TSO, VM/CMS or CICS operating systems running on the host.

PJ/FTS and Graph/FTS are available for \$1,000 for a corporate single-site license and \$5,000 for a corporate multiple-site license, according to the vendor.

For additional information, Forte Communications is located at 2205 Fortune Drive, San Jose, Calif. 95131.



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■ Real-Time Computer Science Corp. (RTCS) has released configurable versions of its real-time operating systems, PC/RTX and AT/RTX, which allow users to write their own IBM Personal Computer XT or Personal Computer AT device drivers for real-time applications.

The PC/RTX and AT/RTX operating systems are implementations of Intel Corp.'s iRMX 86 real-time multi-tasking operating system specially configured to run on the IBM Personal Computer, Personal Computer XT and AT.

The RTX-C products are the configuration source files and device driver libraries contained in a file, which includes the object modules for all drivers and instructions for specifying device unit information

Continued on page 80

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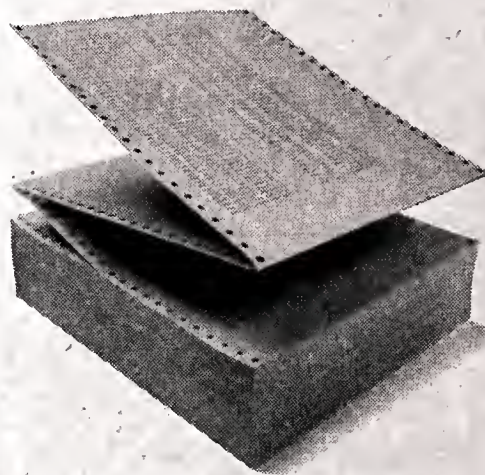
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MICROCOMPUTERS

Continued from page 79

blocks, the vendor said.

The PC/RTX operating system for the Personal Computer and XT costs \$995 and the AT/RTX for the Personal Computer AT costs \$1,495. The PC/RTX-C I/O library costs an additional \$2,000 and the AT/RTX-C costs an additional \$2,795.

RTCS, Unit E, 1390 Flynn Road, Camarillo, Calif. 93010.

■ Decision Resources, Inc. has announced enhanced versions of its business graphics software for the IBM Personal Computer, Personal Computer XT, AT and compatible machines.

Chart-Master 6.1 includes Datagrabber, a capability that allows users to bypass Data Interchange Format files and move directly into the spreadsheet to extract data for use in line patterns and axis and pie charts, the vendor said. The program includes access to two new fonts.

Chart-Master provides users with customizing options like hatch and line patterns, colors and axis control. Text can be underlined, italicized or justified in 16 different type sizes.

New graphics and fonts have also been added to Sign-Master 5.1, a text graphics product for slide presentations. The product allows users to change the size, color and position of data for the slide.

The products will work with IBM's recently announced Proprinter and Color Jetprinter, according to the vendor.

Available this month, Chart-Master 6.1 and Sign-Master 5.1 cost \$375 and \$245, respectively.

Decision Resources, 25 Sylvan Road S., Westport, Conn. 06880.

■ Hale Systems, Inc. has announced financial management modeling software that runs in conjunction with Lotus Development Corp. 1-2-3 on the IBM Personal Computer, Personal Computer XT or AT.

Financial Institution Planning System (Fips) is reportedly an asset and liability management model that allows financial institutions to develop, test and revise operating strategies based on data from 1-2-3 spreadsheets.

The software is said to integrate long-term strategic planning in short-term budgeting, produce budget-to-actual variance reports, generate earnings projections and test many different expansion and merger scenarios.

Fips is said to include gap analysis and predefined color graphics capabilities. According to the vendor, it also features report generating

MICROCOMPUTERS

capability in detailed or summarized formats. The product requires 512K bytes of memory to run in conjunction with 1-2-3.

Fips costs \$9,500.

Hale Systems, 1044 Northern Blvd., Roslyn, N.Y. 11576.

■ **Deeresoft, Inc. has announced Version 2 of its menu system software for the IBM Personal Computer, Personal Computer XT and AT and compatibles running under either IBM's PC-DOS or Microsoft Corp.'s MS-DOS operating systems.**

Features added to the Magic Menu program include configuration, user file maintenance, menu editor and menu display functions. An audit trail analyzer program is available at an additional cost.

The package requires 128K bytes of memory, a floppy or fixed disk and Version 2 or later of the operating system.

Magic Menu costs \$99.

Deeresoft, P.O. Box 1360, Melbourne, Fla. 32901.

■ **Software Synergy, Inc. has introduced software that reportedly enables IBM Personal Computers and compatibles with 256K bytes of memory and IBM's PC-DOS Version 2 or later to communicate with mainframes, minis and microcomputers as well as with on-line information services.**

The system must include an internal or external mode, one double-sided diskette drive, an 80-col. monochrome or color monitor and an asynchronous I/O board with appropriate cabling.

The software, Respond/Async, reportedly emulates the terminal features of the Digital Equipment Corp. VT100, VT102 and VT52; the IBM 3101 Model 10; and Hewlett-Packard Co.'s 2621B, 2622A and TTY.

It allows micros to access subscriber services like Source Telecommunications Corp.'s Source; Official Airline Guides, Inc.'s Official Airline Guide; Dow Jones, Inc.'s Dow Jones News/Retrieval service; and CompuServe, Inc.'s CompuServe.

The package costs \$175.

Software Synergy, 466 Main St., New Rochelle, N.Y. 10801.

■ **Postley Software, Inc. has announced data base management and report generating software for the IBM Personal Computer, Personal Computer XT and AT.**

DBS/Experience is said to contain on-screen Help instructions on all menus to lead users through procedures such as setting up files

and inserting and retrieving information. The product is said to provide displays or reports from existing files or subsets of data files.

The software reportedly can perform computations on stored data and summary calculations. Reports are said to be automatically formatted for screen or printed presentation.

DBS/Experience requires IBM's PC-DOS Version 2 or later and resides in 64K bytes of memory.

DBS/Experience costs \$345.

Postley Software, 6855 Hayvenhurst Ave., Van Nuys, Calif. 91406.

■ **Coefficient Systems Corp. has announced a version of its Vterm software for the IBM Personal Computer line and compatibles.**

The Vterm/4010 is said to combine Tektronix, Inc. 4010 terminal emulation, Digital Equipment Corp. VT100 ter-

minal emulation, four error-correcting file transfer protocols (including Kermit) and communications capabilities up to 9.6K bit/sec.

The package is said to support Microsoft Corp.'s mouse, programmable softkey macros, setup screens, on-line Help facilities and automatic dialing.

The file transfer system that includes Kermit supports wild card transfer, server commands, data compression and command mac-

ros, the vendor said.

Kermit requires host software available from Columbia University.

The Vterm/4010 emulates 132-col. display with horizontal scrolling and can reportedly redisplay data that has scrolled vertically off the screen.

The package is priced at \$249.

Coefficient Systems, 611 Broadway, New York, N.Y. 10012.

See **TOOLS** page 84

Novell introduces the best way to improve your network reception.



In a relatively short time, the local area network (LAN) market has attracted a host of suppliers. Each has a LAN system to sell. And each is fighting for a proverbial piece of the LAN pie.

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For more information, call or write Novell, Inc. 1170 N. Industrial Park Drive Orem, Utah 84057 (801) 226-8202

*LAN Benchmark Report, May, 1985, Novell, Inc. and "Software, Not Hardware Key to LAN Performance," PC Week 1/15/85.

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MICROCOMPUTERS

TOOLS from page 81

■ **Applied Business Technology Corp.** has announced the enhancement of its **Project Manager Workbench** software for the IBM Personal Computer line.

According to the vendor, Release 2.1 is also compatible for use on the Digital Equipment Corp. Rainbow micro-computer.

The enhanced product reportedly includes improved display capability for multiple projects on a Gantt chart and the ability to preview on-screen reports before they are saved on disk.

The release is said to include user-assigned priority in automated scheduling and to handle up to 200 resources or tasks per project, depending on system memory capacity.

The advanced version of Release 2.1 is also said to integrate text processing with two independent windows for cutting and pasting.

Project Manager Workbench Version 2.1 runs on the IBM PC-DOS operating system and resides in 384K bytes of memory.

Project Management Workbench is priced at \$750 for the standard version and \$1,150 for the advanced version.

Applied Business Technology, 6th Floor, 365 Broadway, New York, N.Y. 10013.

■ **Beacon Hill Software Corp.** has announced three data management software programs for the IBM Personal Computer and compatibles and machines under AT&T's Unix.

The DP Workbench (DPW) — written in C — is said to manage data stored in DOS files and to be capable of being ported to any machine that has a C compiler. It reportedly enables users to reformat, combine and extract information from data files. It can be used to manage a data base of DOS files and, in conjunction with a data base management system, to create and reformat data files for input to the DBMS, the vendor said.

DP Form is a forms manager, and DP Report is a report generator; both reportedly work in conjunction with the DPW or can stand alone.

The DPW package costs \$99; DP Form and DP Report cost \$49 each.

Beacon Hill Software, Suite 1409, One Devonshire Place, Boston, Mass. 02109.

■ **Persoft, Inc.** has introduced Smarterm 220 software, said to permit the IBM Personal Computer to emulate a Digital Equipment Corp. VT220 terminal fully supporting DEC's A-to-Z and other DEC software packages.

Smarterm 220 is also said

to be able to transfer Ascii and binary program and data files between the Personal Computer and a host system. It offers all of the features of the VT220, including full keyboard emulation, English language setup mode, programmable function keys and multinational character sets.

The software is priced at \$195. Existing Smarterm 100 users can upgrade for \$75.

Persoft, 2740 Ski Lane, Madison, Wis. 53713.

■ **Micro-MRP, Inc.** has introduced its **Management Performance Module** for use with its "Max, The Production Manager," a manufacturing resource planning system for the IBM Personal Computer line.

The Management Performance Module reportedly analyzes and summarizes quantities and costs of surplus inventory, purchase orders, material requirements, work order activity and all inventory transactions. It also ana-

lyzes shop order shortages and the timeliness of vendor deliveries and work order completions.

The module costs \$2,000.

Micro-MRP, 1065 E. Hillsdale Blvd., Foster City, Calif. 94404.

SYSTEMS

■ **Docutel/Olivetti Corp.** has unwrapped its **M24 personal computer**, said to be

compatible with the IBM Personal Computer.

The M24 includes a serial port, parallel port, clock and calendar, monitor, graphics card for alphanumeric and graphics information and seven expansion slots.

Users may select either two 360K-byte floppy disks or one 360K-byte floppy disk and one 10M-byte hard disk. The monitor, available in monochrome or color, features 640- by 400-pixel resolution.

Introducing The Single Solution To Many Problems That Can Tie Up Your Personal Computer.

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MICROCOMPUTERS

Prices range from \$2,745 for floppy drives, 128K-byte memory and monochrome monitor to \$5,570 for a hard-disk model with 256K-byte memory and color monitor.

Docutel/Olivetti, 5615 Highpoint Drive, Irving, Texas 75062.

■ **Leading Edge Products, Inc.** has announced a model of its **Leading Edge Personal Computer** that reportedly is compatible with the

IBM Personal Computer.

Model D features 256K bytes of random-access memory (RAM), expandable to 640K bytes of RAM; four expansion slots; two 5¼-in., double-sided, double-density disk drives; an Intel Corp. 8088 microprocessor; parallel port; and serial port.

The product includes a 12-in. green or amber screen and a Hercules Computer Technology graphics card that supports high-resolution monochrome or color output.

Bundled software consists of Microsoft Corp.'s GW Basic and MS-DOS operating system.

The product sells for \$1,495.

Leading Edge Products, 225 Turpike St., Canton, Mass. 02021.

■ **Cado Systems Corp.** has added two workstation models and an entry-level system to its line of Tiger ATS multiuser computers.

The Tiger DS/PC and the Tiger DS/XT workstations will function as decision support workstations in any Tiger ATS system or can be used as stand-alone desktop computers, the vendor said.

The DS/PC uses the 16-bit Intel Corp. 8088 chip and provides 256K bytes of memory and two 360K-byte diskette drives. The DS/XT substitutes a 10M-byte Winchester hard disk drive for one of the two diskette drives.

Both models incorporate Microsoft Corp.'s MS-DOS operating system, are available with either color or monochrome monitors and include graphics and real-time clock capabilities.

The basic Tiger DS/PC costs \$2,960, and the DS/XT starts at \$4,660. Prices include Contel Cado's Tiger-Link software, which allows the workstation to emulate the company's C-300 terminal and which accepts file transfers from Tiger ATS systems.

The company also announced the Tiger ATS8 entry-level system, which supports one to eight users. The system is compatible with other Tiger ATS computers that support from 16 to 64 users.

The basic model consists of a four-port processor module using an 8-MHz Intel 80186 microprocessor, 256K bytes of memory, a 10M-byte Winchester hard disk and either a 1.2M-byte floppy disk or a 20M-byte streaming tape cartridge for backup and a Cado C-301 word processing terminal.

The unit costs \$7,650.

Cado Systems, P.O. Box 3759, 2055 W. 190th St., Torrance, Calif. 90510.

■ **Innovative Electronics, Inc.** has announced its **Innovative Factory Data Collection System**, which reportedly provides records of time and attendance, inventory control, work in process and job tracking.

The system, which runs under IBM's PC-DOS, reportedly also provides shipping and receiving control, quality control and customer chargeback functions. It operates in stand-alone mode or in conjunction with an IBM Personal Computer, a Digital Equipment Corp. VAX-11/780 or (with the addition of Innovative's MC80 protocol converter) with an IBM System/36 host computer.

The basic system includes Innovative's Netmaster unit, 10 of the company's Transactor terminals with bar code wands, custom software, host communications software and two 360K-byte disk drives.

The basic system costs \$35,000. A similar system with one 10M-byte hard disk and one 360K-byte floppy disk costs an additional \$4,000.

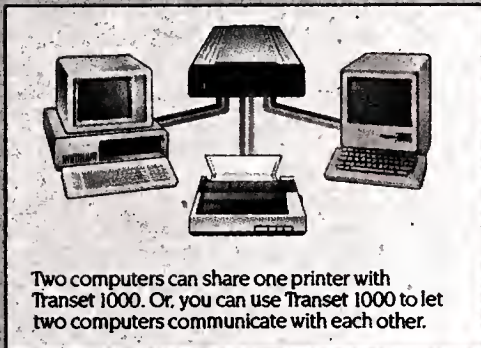
Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

Transet 1000™. The print buffer, communications buffer, port expander, printer sharer and I/O switcher. All in one.

Anyone with a personal computer and one or more peripherals has faced the all-too-familiar dilemma. You need your computer to do an important job. But you're forced to wait for the system to finish one job (printing, communicating, whatever) before you can go on to the next one. Or you need to stop what you're doing to switch cables when you want to use another peripheral.

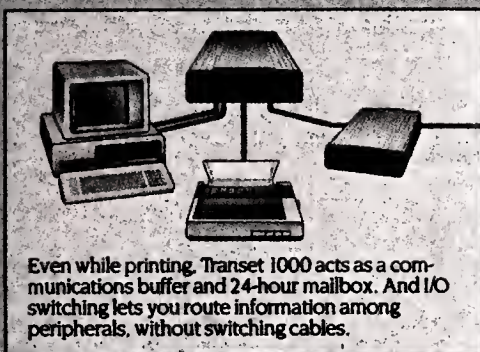
Wait no more. Now Hayes introduces an innovative new device that lets you perform many jobs—at the same time—independent of your computer. Transet 1000. It works with a wide range of systems and configurations. And it allows you to continually expand your system as your needs grow.

Transet 1000 frees your computer from waiting on your printer or modem—so you and your computer can go on to another task. It even lets you print out documents in pre-set formats without having to go back into your computer. At the same time, Transet 1000 can operate unattended mailbox communications—24 hours a day—even if your computer is turned off.



Two computers can share one printer with Transet 1000. Or, you can use Transet 1000 to let two computers communicate with each other.

In addition, Transet 1000 is a port expander and software-controlled I/O switcher. Now files can be easily directed and redirected to different peripherals, without physically changing cable connections.



Even while printing, Transet 1000 acts as a communications buffer and 24-hour mailbox. And I/O switching lets you route information among peripherals, without switching cables.

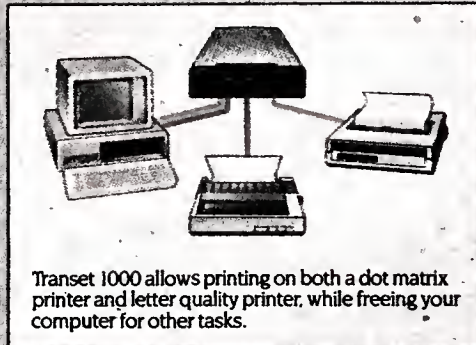
Transet 1000 contains a stand-alone microprocessor, and comes with 128K of memory. It operates with any RS-232 interface computer, and has optional accessory kits available for the IBM® PC and PC XT, Macintosh™ and

Apple® IIc. Kits contain the necessary host cable, a user guide and menu-driven software that lets you graphically set up or customize port

parameters and printing formats. Cables available for IBM PC AT, other computers and peripherals.

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MICROCOMPUTERS

KEYS from page 75

and Wordstar. Also called macro processors, the utilities reside in memory alongside an application, bringing to that application macros that have previously been written or those the user creates while the application is running.

Because these utilities work so closely with the keyboard, the greatest stumbling block can come when they attempt to interact with a program such as Microsoft Corp.'s Word, which is said to take over the keyboard. No keyboard utility is said to be able to work with Microsoft Word 1.0, for example, but all are supposed to be able to work with Word 2.0, the latest version of that word processor.

Since 1979 when Software Research Technology, Inc. introduced the first keyboard utility, Smartkey II, sales for such products have grown steadily. The current market leader in the Microsoft MS-DOS-based world is said to be Rossoft's Prokey and, until last month, few other products had stepped forth to challenge its domain.

However, Borland International began shipment of its Superkey in May, and Al-

pha Software planned to deliver Keyworks last week. Both run under MS-DOS. Not to be outdone, Rossoft also began shipment late last month of an enhanced version of Prokey.

Unlike other keyboard utilities, though, Keyworks reportedly will permit the user to use macros to change entirely the interface that an application presents to the user. In the words of Alpha Software Executive Vice-President Selwin Rabin, Keyworks' ability to let the user create his own pop-up menus will let him "make a program like [Micropro International's] Wordstar look like it was written for the [Apple Computer, Inc.] Macintosh."

Both the \$89.95 Keyworks and the \$69.95 Superkey reportedly offer data encryption in addition to their macro-generating capabilities. Superkey boasts two types of encryption: a proprietary method and the U.S. government's Data Encryption Standard.

The ability to create macros, though, is still each package's prime feature. Keyworks and Superkey both have pop-up menus of their macro editing functions and are compatible with

most popular applications software.

Superkey also claims compatibility with Prokey macros — a feature that would permit it to interact with

”

'If you've never used a macro processor, I think you're missing out.'

— Conrad Kageyama
electronic bulletin
board operator

macros already created by any of the 50,000 copies of Prokey in use.

The latest release of Prokey, the \$129.95 Version 4.0, meanwhile, trumpets its ability to execute macros using English-language commands or user-created abbreviations. A user who wanted to

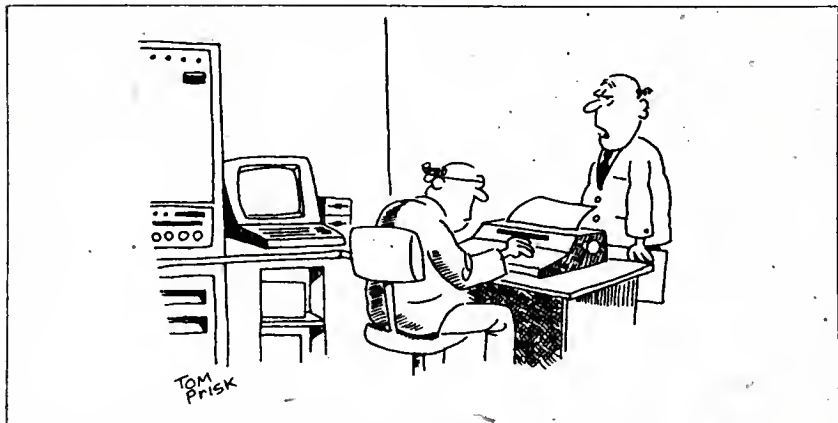
find IBM's closing stock price, for example, could simply type "IBM," and the macro he had already created would log on to the Dow Jones News/Retrieval service and display the stock quote.

Despite the number of new or enhanced offerings, market analyst Mary Ellen Dick of the research firm Software Access International, Inc. does not believe that demand for keyboard macros extends beyond sophisticated personal computer users, who she said account for less than a third of all users. "I don't think you're going to see big growth" in the keyboard utility field, she observed. Regarding Superkey's data encryption feature, she said, "Only a small group of people are interested in encrypting their work," but added that their numbers may grow as the use of local-area networks and

multiuser personal computers becomes more widespread.

Alpha Software's Rabin, however, said he believes user wariness about macro processors stems from the fact that "CONTROL A [a typical command for a macro] is only slightly less cryptic" than the original, lengthy command is. What is needed, he argued, are macro processors that simplify macro generation, with such features as moving-bar pop-up menus.

Whatever the method of selection, one dedicated macro user, Conrad Kageyama, operator of an electronic bulletin board in Los Angeles, said he thinks every personal computer user should have a keyboard utility. The use of macros "can save a lot of redundant keystrokes," he advised. "If you've never used a macro processor, I think you're missing out."



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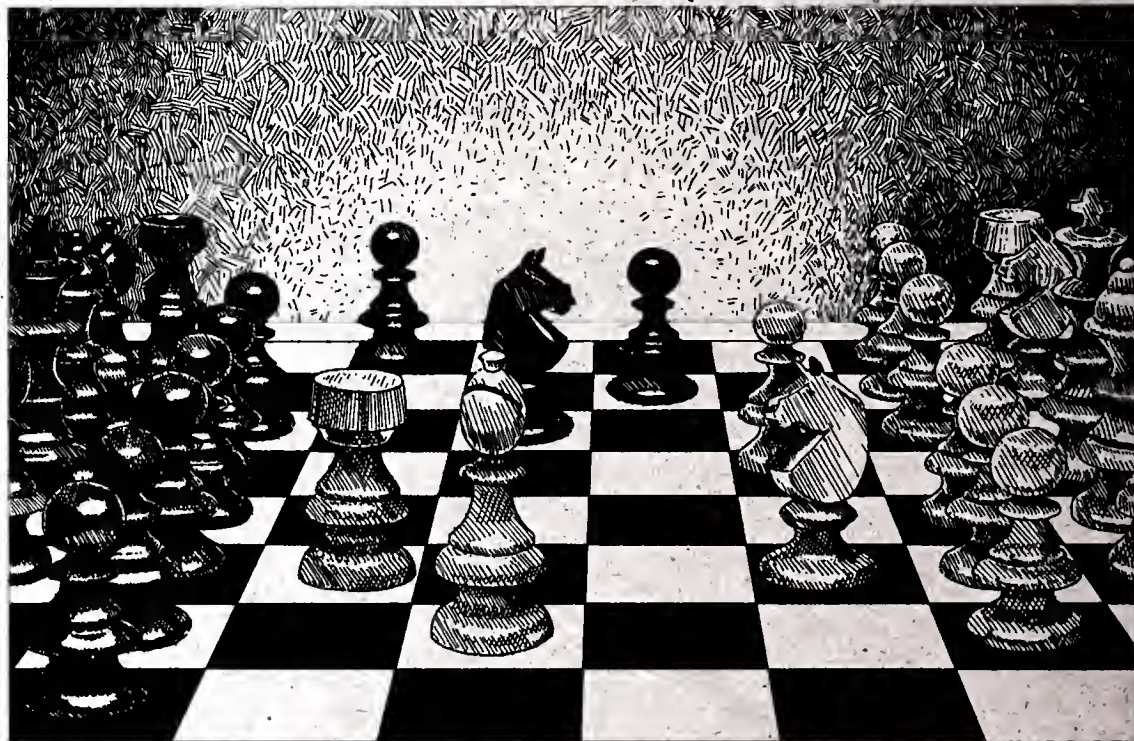


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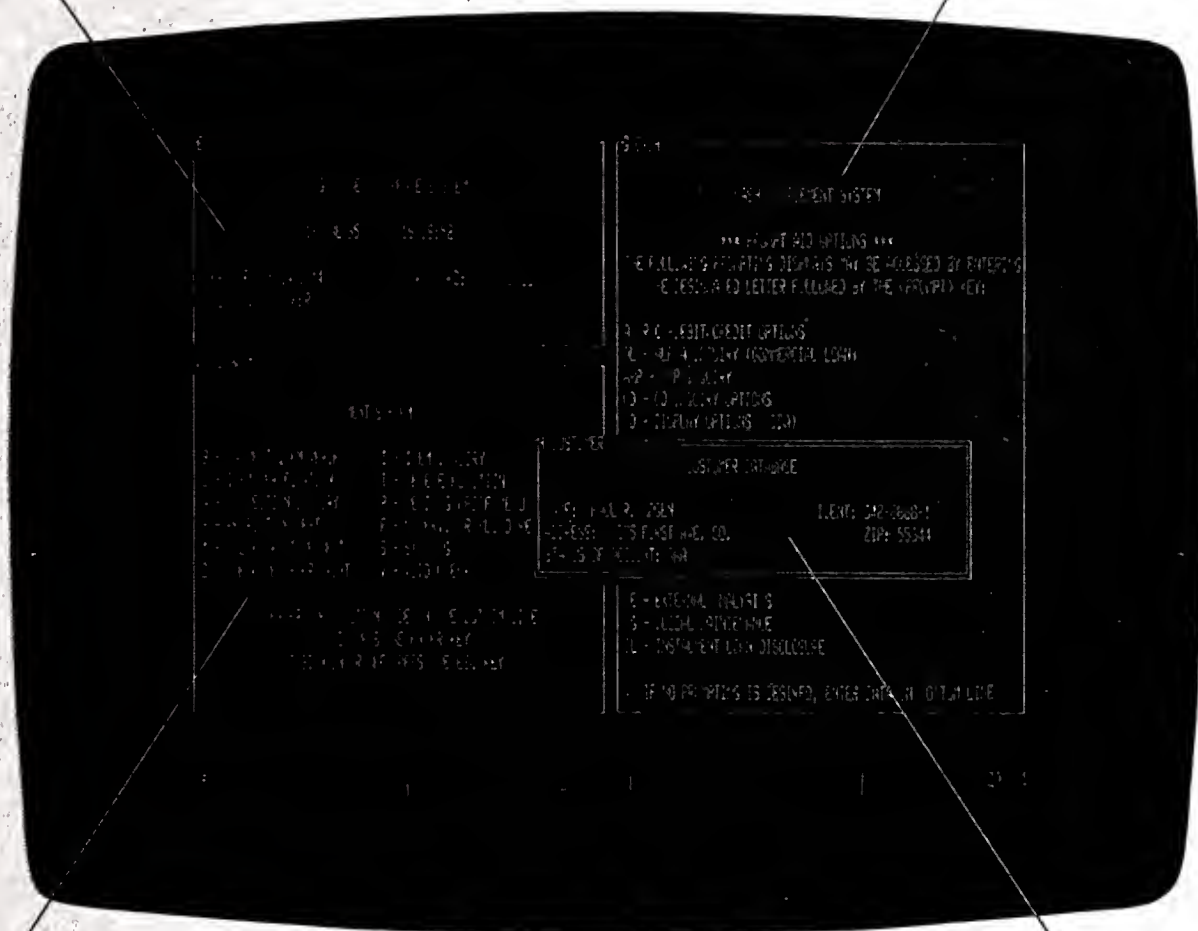
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"Altos is way ahead of everybody else." (Creative Strategies, Computerworld, April 1985): high speed 8 KB cache maximizes CPU speed, with no wait states; cache is simultaneously shared between many processors; high performance memory management supports demand paged virtual memory; on-board microprocessors handle all I/O processing.

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COMPUTER SYSTEMS

WORLD LEADER IN
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MICROCOMPUTERS

ERROR from page 75

rules are, unless somebody tells you."

As John Xenakis of *Computer Update* said, "The probability of a programming error in a spreadsheet program is perhaps hundreds of times as great as it would be if the same algorithm were written using a more structured programming language."

In short, spreadsheet users are assembly-language-like programmers, whether they know it or not, and they are flying blind. Spreadsheets cannot instill confidence that analyses accurately reflect management's understanding of its own business. Among solutions proposed in the press are the following:

■ Be more careful. Take notes and thoroughly document everything.

■ Have central spreadsheet auditing staff members review all spreadsheet work.

■ Use one of the after-market programs that prints spreadsheet formulas in their correct cell-by-cell orientation.

■ Attend training seminars.

Proposed solutions do not work

None of these work, because they go against the grain of human nature. Nobody really wants to spend large amounts of time tracing logic that is buried in piles of hieroglyphic formulas; nobody wants to stifle the very spontaneity of the micro by submitting every-

thing to an audit committee; and nobody wants to take a class just to learn how to trick a software program into doing the obvious.

The root of spreadsheet limitations is that the software is the simple mechanization of row and column arithmetic that has been the practical calculating convention for several millennia. What may be an appropriate tool for formatting reports is now used as a general-purpose modeler. No amount of modification can satisfactorily make up for its limitations.

Finally, the spreadsheet way of doing things is just plain tedious.

Instead of other software Band-Aids on top of spreadsheets or additional layers of clumsy bureaucratic checks, what is needed is a new software paradigm, and some new technical directions are

beginning to appear.

Artificial intelligence research clearly offers great potential in many applications. Practical results to date have appeared in medical diagnosis and prognosis, in diagnosis of mechanical systems and in the form of natural language.

The initial excitement over natural language interfaces has cooled, however. It seems that relating to a computer in long phrases is quite cumbersome in many applications.

Big business management has developed a healthy skepticism of quantitative analysis. The last thing business management wants is to jump from the frying pan

into the fire — from inexperienced human analysts to much more naive, and much less tractable, artificial intelligence software.

But there is a new form of knowledge representation which offers great potential to business management: natural intelligence. Natural intelligence systems allow users to express their analytic thoughts as freely and clearly as a computer will allow at the present time, and then revise them or explain them to others.

What makes software so exciting is that its history has only begun and that the technology is cumulative in its knowledge. The basic inventions are yet to come.

BETA from page 75

Another feature that Stein said he liked in *Keywords* was that it "prompts you as you go, [so that] you're never lost." His copy of *Prokey*, he continued, sometimes leaves him confused; when a key is defined as a pause, for example, all that is displayed is the cursor.

Stein found two "cosmetic bugs" in the version of *Keywords* that he used and said both were later corrected. His firm, which trains executives in personal computer use, plans to recommend that its clients buy *Keywords* and familiarize themselves with macro processing, he noted.

Conrad Kageyama, the beta tester of Borland's *Superkey*, is also a veteran *Prokey* user. A Los Angeles gas station operator by day and electronic bulletin board systems operator in his off-hours, Kageyama said he likes *Superkey* for its ability to clear a current macro and load a different macro without having to exit from an application. Such a feature, he pointed out, is not available in the earlier version of *Prokey* that he uses. The feature is available in the latest release of *Prokey*, Version 4.0, a *Rossoft* spokeswoman said.

Kageyama is no stranger to macros; he uses a 7,000-char. macro, written using *Prokey*, to load his station's daily sales figures into 1-2-3 automatically. Since *Superkey* reads *Prokey* macros, Kageyama was able to avoid rewriting that massive macro and still gain *Superkey* features.

Kageyama said he has little use for *Superkey*'s data encryption features, which reportedly allow users to encode data to either a Borland-created scheme or the Data Encryption Standard of the U.S. government.

Data switching: Equinox makes it simple.

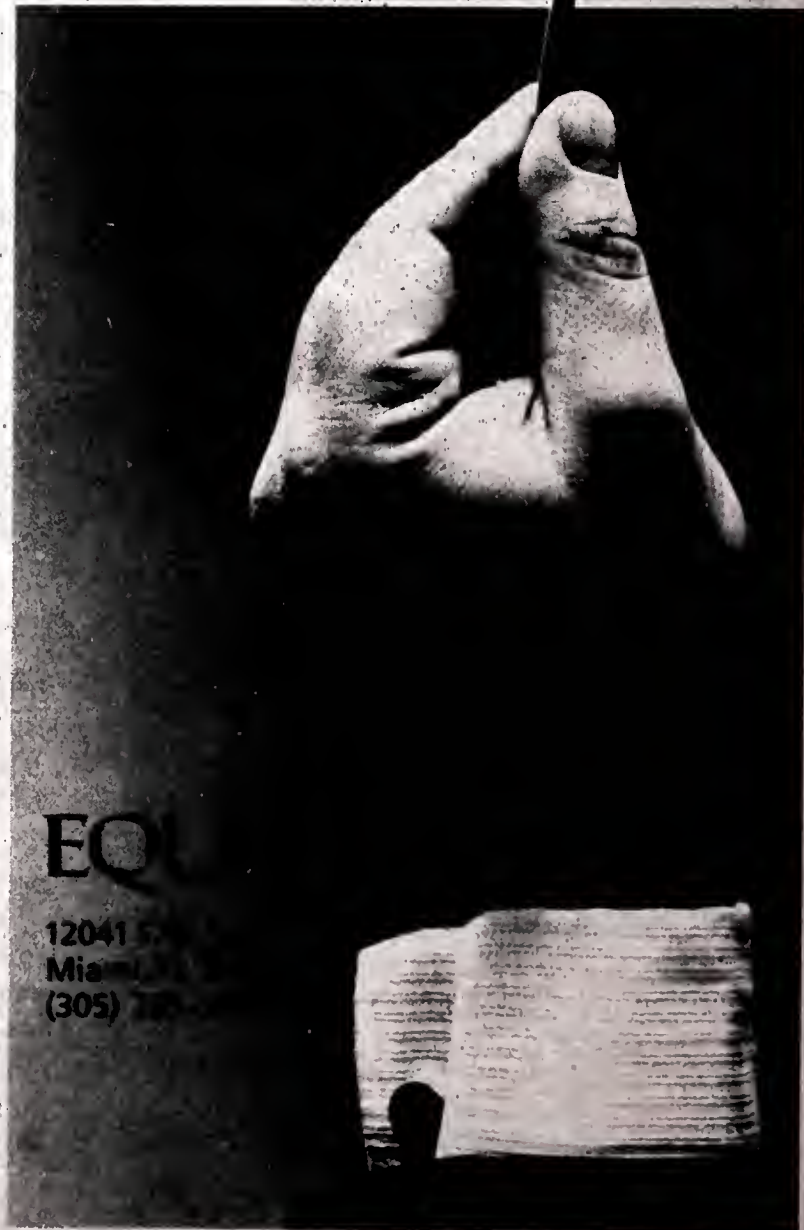
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COMMUNICATIONS

WIRE TAP/DANIEL MINOLI

Higher initial costs pay off

Divestiture has altered the way communications managers and network planners must function. Installation intervals have become longer and installation costs are rising, thereby curtailing network elasticity and the ability to effect quickly redesigns, optimization and patches. Mean time between failures and mean time to repair figures have generally suffered due to the intrinsic plurality of service providers on a given end-to-end link.

There are two ways to approach the altered fabric of network management in this new environment, and both can be valid depending on an organization's point of reference, definition of efficiency or optimality criteria.

The first approach follows the status quo philosophy in network design. The cost function is taken to be the sum of the cost of all network components, without explicit consideration given to secondary costs associated with downtime and repair intervals. When a network link fails, the operations manager faces the vicissitudes of restoration and the ensuing service interruptions. No explicit redundancy is built into the network at implementation time.

The advantage of this approach is an apparent reduction in costs, both when the network is implemented and in recurring expenses. This may be acceptable in an insurance company's bill processing or batch environment. In reality, this approach is the de facto paradigm for a large percentage of commercial networks.

The problem with such an approach is that literally millions of dollars in real or potential revenue can be lost

See ALTER page 102

Minoli is an associate vice-president, systems planning and engineering, of Prudential-Bache Securities, Inc. in New York.

Survey finds firms plan telecom budget increases

By Paul Korzenlowski
CW Staff

NEW YORK — There's a "whole lotta shakin' goin' on" in the communications field, according to a report by the Conference Board, Inc., a market research outfit headquartered here.

The report, "Current Issues in Corporate Telecommunications," found that 92% of the corporations surveyed plan a major telecommunications change in the next three years. The 348 survey respondents have more than \$10 million in annual sales.

The telecommunications changes included budget increases. Three quarters of the respondents expected costs to increase during 1985 and 1986; one quarter of the firms projected 9% to 12% increases.

The survey determined how the budgets are divided. Costs were split into internal communications, which included private branch exchange costs; long-distance voice

transmission; long-distance data transmission; local voice transmission; local data transmission; and overhead. Internal communications and long-distance voice transmission were the most costly items. Half of the firms reported that internal communications takes up 20% to 40% of their budgets. Long-distance charges account for 30% to 35% of most budgets.

Respondents were asked to name their most costly long-distance service. Close to 60% named AT&T's Wats. The second and third most cited services were AT&T's message units and AT&T's private lines, 15% and 10% respectively.

To implement communications changes, approximately two-thirds of the communications managers plan to revamp their staffs and organizations in the next two years. The most likely change will be pulling communications functions into one group or shifting communications respon-

See POLL page 104

■ Fujitsu America has announced an 810M bit/sec., single-mode fiber-optic system that can carry 12,096 signals/95

■ California Network Systems has announced PCnetwork/SNA 3270 Gateway, which allows microcomputers on IBM's PC Network to emulate IBM 3270 series devices/95

■ Fibercom has announced a fiber-optic multiplexer for IBM 3270 environments that can be multidropped/97

■ MCI Communications has revised its residential and business rates effective July 1/97

Software boosts service options



DATA STREAM
John Dix
CW Senior Editor

AT&T has developed software for switches used by local telephone companies that will enable these companies to offer a host of new calling services for residential and business users.

The capabilities provided with the so-called Local-Area Signaling Services (Lass) were outlined by C. Brant Hirschman, Grant E. Swinehart and Marie L. Todd, all of AT&T Bell Laboratories, in an article in the May issue of the "Record," a Bell Labs publication.

Two telephone companies are reportedly testing Lass, which is said to be based on the Common Channel Interof-

fice Signaling (CCIS) technique used in AT&T's long-distance network. Local CCIS provides transmission of signaling information in the local network independently of the voice network. The four AT&T software components that make this possible run on 1A Electronic Switching Systems, which AT&T manufactured.

The new features include the following:

■ Automatic reconnect. This feature enables callers to redial the last number they called, or the last person that called them, by dialing *66 on a push-button phone or 1166 on a rotary phone. The central office switch scans a temporary memory associated with that line and places the call, all within less than a second.

See SERVICES page 104

INSIDE

Protocol
Converters/97

Software/97

Multiplexers/
Modems/98

Local-Area
Networks/98

Network
Services/102

How to make your computer room bigger by shrinking your modems.

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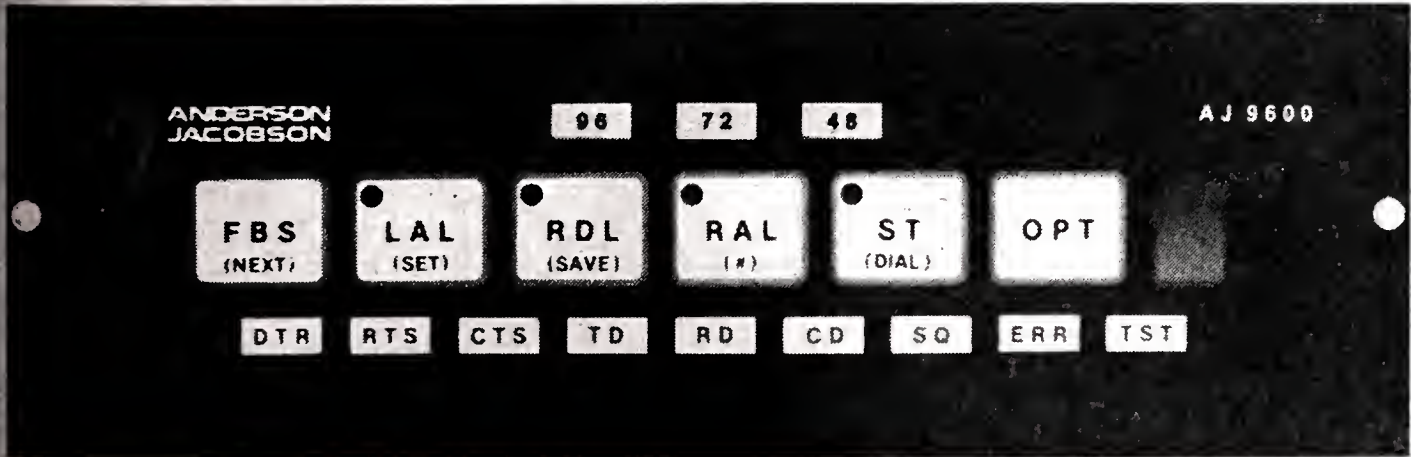
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COMMUNICATIONS

UDS broadens product offerings with five modems

HUNTSVILLE, Ala. — Universal Data Systems, Inc. (UDS) has added five modems to its product line. They include the following:

■ UDS 202S/D is an asynchronous or synchronous half-duplex modem that uses frequency shift keyed modulation and transmits data at speeds up to 1,200 bit/sec.

The product has manual answering and automatic answering, supports pulse or tone dialing and can store one 30-digit number and redial a number up to 10 times. The modem includes automatic loopback dialing circuitry that can be used

to test for a problem.

■ UDS 201B is an asynchronous/synchronous 2,400 bit/sec. half-duplex modem that operates over the switched network or a full-duplex modem with four-wire leased lines.

■ UDS 201C is a half-duplex synchronous modem that transmits at speeds up to 2,400 bit/sec.

■ UDS 212A and UDS 212A/D are full-duplex, asynchronous or synchronous modems that transmit data at speeds of 300 to 1,200 bit/sec. The products' built-in test features include digital loopback, analog loopback, remote digital loopback as

well as self-testing.

Both modems feature automatic answering, and UDS 212A/D includes an automatic dialing feature that stores up to 10 126-char. logon sequences, UDS said.

UDS 202S/D costs \$495; UDS 201B and UDS 201C each sell for \$685; UDS 212A costs \$495; and UDS 212A/D is priced at \$545, according to the vendor.

More information on the modems is available from UDS, located at 5000 Bradford Drive, Huntsville, Ala. 35805.

Controller links IBM, Burroughs

SALT LAKE CITY — Beehive International, Inc. has enhanced its ATL-083 Burroughs Corp. TD830/MT983 emulator to enable simultaneous Burroughs and IBM 3270 communications.

When the ATL-083 auxiliary port is connected to Beehive's CC74 or 3270MS cluster controller, a keyboard command turns the ATL-083 into an IBM 3178/3278 emulator, the company said. IBM screen format and status line/icons are said to be provided, along with full IBM 3178 keyboard function. Concurrent sessions with IBM and Burroughs hardware can be maintained.

The device is said to support Burroughs' major polling protocols such as poll/select, fast select, group poll and multipoint contention.

The emulator costs \$1,295 in single quantities and is available immediately.

Beehive can be reached through P.O. Box 30668, Salt Lake City, Utah 84130.

Encryption tools debut

SUFFERN, N.Y. — Datasentry Technologies, Inc. has announced four data encryption devices.

Two of the encryption devices support both the National Bureau of Standards' Data Encryption Standard and DPS, a proprietary algorithm. The other two devices support one of the two algorithms.

The devices support full-duplex, asynchronous transmissions at speeds of 300, 1,200 and 9.6K bit/sec. The products are reportedly attached through an RS-232 interface.

Prices for various models range from \$595 to \$995.

Datasentry Technologies is located at 1 Executive Blvd., Suffern, N.Y. 10901.



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PHONE COMPANY.**

COMMUNICATIONS

Fujitsu touts capacity of fiber-optic system

LAS VEGAS — Fujitsu America, Inc. announced here recently the development of a single-mode fiber-optic system that is reportedly capable of carrying twice as much information on a single pair of fibers as any lightwave system in use in the U.S. today.

The Optical Fiber Transmission System operates at 810M bit/sec. and can support 12,096 voice, data or video signals, the company reported. It uses proprietary semiconductors that are said to include laser diodes, photo detectors and large-scale integrated circuits.

Prior to the introduction of this system, Fujitsu's 405M bit/sec. fiber system represented one of the largest capacity systems in operation in the U.S., the company claimed. That system could support 6,048 channels.

After completing a final test phase in Japan, the 810M bit/sec. Optical Fiber Transmission System will undergo a U.S. field trial in a telephone network environment and will be added to Fujitsu America's product line in the fourth quarter, the vendor reported.

The estimated cost per circuit mile of the fiber system represents an 85% savings over traditional copper wire technology, the company said.

Fujitsu America is located at 3055 Orchard Drive, San Jose, Calif. 95134.

Gateway out for micros on IBM net

MILPITAS, Calif. — California Network Systems has announced PCnetwork/SNA 3270 Gateway that allows microcomputers on IBM's PC Network to emulate IBM 3270 series devices.

Depending on the configuration, either a personal computer on the network or a Netserver Communications System from California Network Systems functions as the gateway.

In either implementation, the gateway mimics an IBM 3274 Model 51C or Model 61C controller supporting 3278 and 3279 displays and 3287 printers.

The gateway is supported with IBM's Synchronous Data Link Control (SDLC) protocol under Systems Network Architecture (SNA).

The product will reportedly be compatible with all IBM-compatible networks that implement IBM Netbios, including Microsoft Corp.'s MS-Networks and Intel Corp.'s Open Net.

The PCnetwork/SNA 3270 Gateway family of products is said to provide users with three configuration options that vary by price and performance.

The entry-level product is software that runs on an IBM Personal Computer, Personal Computer XT, AT or compatible that has an IBM SDLC card. It enables up to 12 concurrent SNA 3270 sessions to be supported.

By replacing the SDLC card with a Comcard Communications Card the number of concurrent SNA sessions supported by the gateway can be increased to 24. When a Comcard and associated software is used in a dedicated Netserver Communications System up to 48 SNA 3270 sessions can be supported.

The Netserver can support a total of four Comcards, providing for up to 192 sessions on four SNA networks, the vendor reported.

A feature of the product called Hotkey is said to enable users to toggle between 3270 display screens and DOS applications that are maintained concurrently. Hotkey can also be used to switch between the gateway status screen and other DOS applications.

To serve as a gateway, Personal Computers must have 384K bytes of random-access memory (RAM) and 8K bytes of RAM for each active mainframe session.

Gateway prices average \$500 per microcomputer.

California Network Systems is located at 372 Turquoise St., Milpitas, Calif. 95035.

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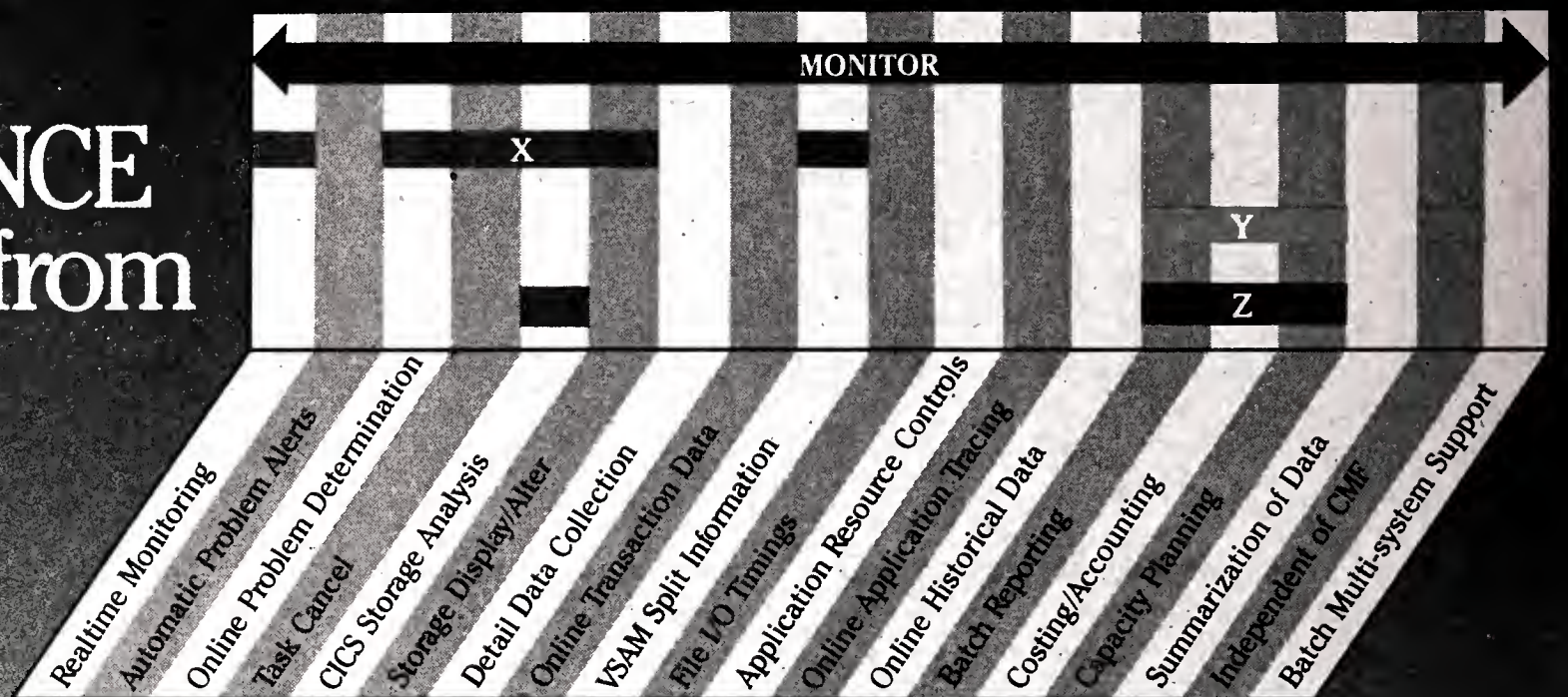
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COMMUNICATIONS

MCI files rate revisions with FCC effective July 1

WASHINGTON, D.C. — MCI Telecommunications Corp. has announced that it has filed rate revisions with the Federal Communications Commission that are scheduled to go into effect July 1.

The rate changes include the following:

- Reductions of up to 11% for residential and business services.
- Elimination of the \$10 Advantage Service Customer fee to customers with monthly bills of \$200 or more, which automatically dials MCI access numbers and provides account billing.

■ Volume discount reductions of 2% to 9% for customers with \$20 to \$200 monthly bills.

■ An average 4% reduction for daytime MCI Wats customers with 40 to 80 hours of monthly use. In addition there is a 4% increase for nighttime Wats fees.

■ A 5 cent increase in per-call surcharges of travel card rates. First-minute travel card rates have been increased, and most additional-minute rates have been decreased.

MCI Telecommunications is located at 1133 19th St. N.W., Washington, D.C. 20036.

Fibercom multiplexer out; supports up to 32 cables

ROANOKE, Va. — Fibercom, Inc. has announced a multiplexer that supports up to 32 coaxial cable outputs from an IBM 3274 communications controller over a single pair of fibers.

The rack-mounted FMX-32 is modular and can include from one to four eight-channel cards, according to Fibercom. Distances between controller and remote end points can range up to 15,000 feet, three times the reach of coaxial cable, the company reported.

Company President Albert Bender claimed the FMX-32 is the only fiber-

optic multiplexer that supports multidrop configurations.

Using a passive star coupler at the remote site, the multiplexed signal coming over the pair of fibers can be split and routed to up to 10 locations, Bender said.

Full IBM Type A peripheral speeds are said to be maintained.

Available now, the FMX-32 costs \$1,930 for an eight-channel unit and \$3,860 for a 32-channel configuration.

For more information, Fibercom can be reached through P.O. Box 11966, Roanoke, Va. 24022.

PROTOCOL CONVERTERS

■ Datagraf, Inc. has announced a bisynchronous protocol converter said to be available for IBM Systems Network Architecture (SNA), Burroughs Corp. or Ascii hosts.

The Series II 3270 Bisynch Host Protocol Converter reportedly supports the bisynchronous output of IBM 3271, 3274, 3275 or 3276 controllers for conversion to or from a protocol of the user's choice.

The 3270 Bisynch Host/SNA is said to enable bisynchronous controllers to emulate an IBM 3274 SNA/Synchronous Data Link Control controller. It reportedly supports eight devices, expandable to 32.

The 3270 Bisynch Host/Burroughs reportedly makes a bisynchronous controller look like a Burroughs TD 830 or MT-983 poll-select terminal. It is also reportedly expandable to 32 devices from its standard eight.

The Bisynch Host/Ascii converter is designed to be implemented over local-area or packet networks, the vendor said. It reportedly supports up to seven Ascii lines for porting to a network bus interface unit.

The 3270 Bisynch Host/SNA costs \$5,995; the 3270 Bisynch Host/Burroughs is \$6,200; and the Bisynch Host/Ascii converter costs \$6,395.

Datagraf, No. 100, 6626 Silvermine Drive, Austin, Texas 78736.

■ Method Systems has announced PCT-100, a communications device that enables Digital Equipment Corp. VT100 or VT200 terminals to emulate Data General Corp. Dasher D200 terminals.

The product mimics Dasher function key and screen attribute features so users can run any DG system utility, the vendor reported. A user can set communications parameters for various bit/sec. rates, parity checks and handshaking techniques.

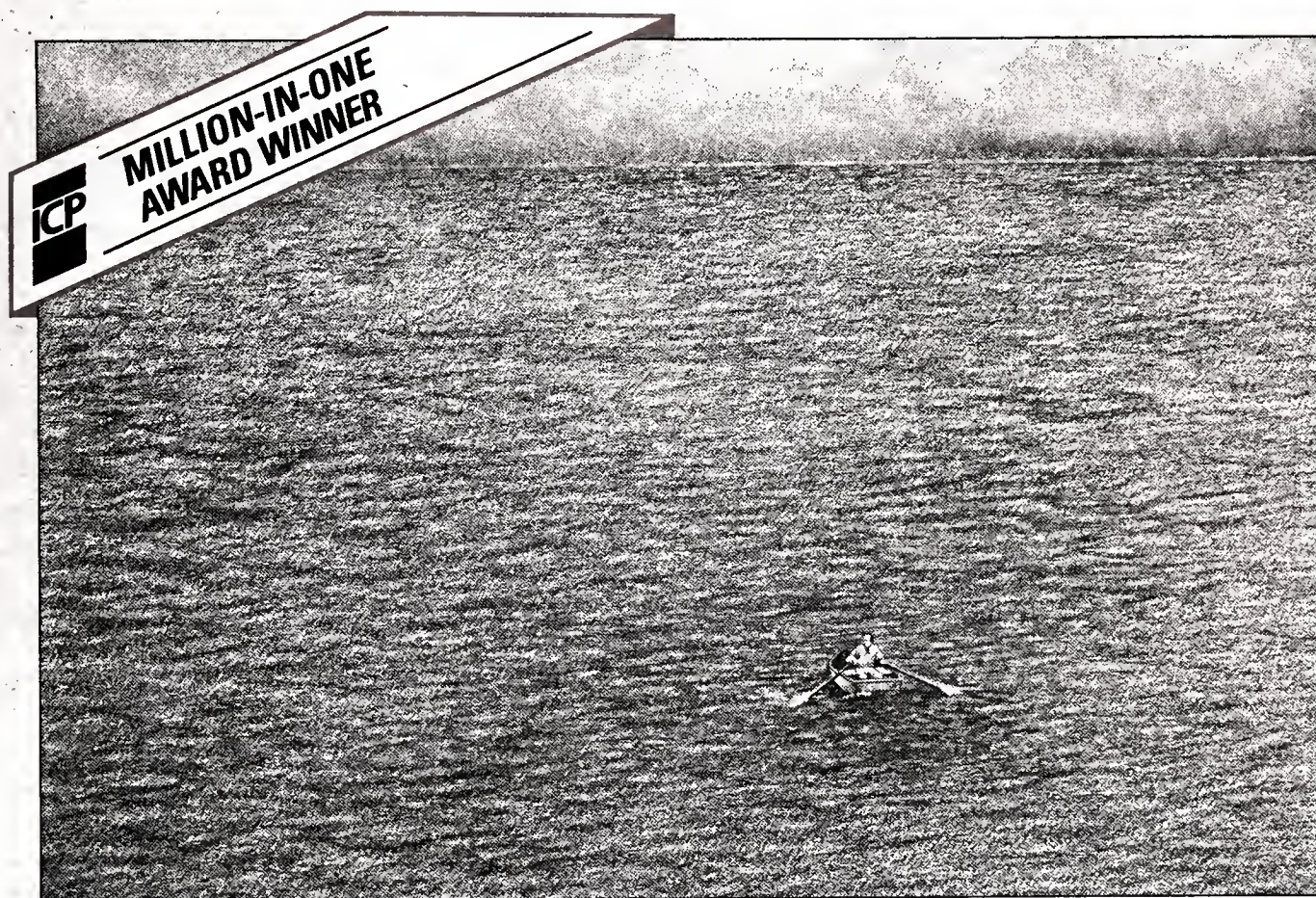
PCT-100 for a VT100 costs \$595, and for a VT200, it costs \$605.

Method Systems, Suite 202, 3511 Lost Nation Road, Willoughby, Ohio 44094.

SOFTWARE

■ Fischer-Innis Systems Corp. announced Release 2.4 of Emc2, an electronic mail service for IBM

Continued on page 98



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COMMUNICATIONS

Continued from page 97

mainframe MVS and DOS environments running TSO, CICS or ACF.

A spokesman said the product includes capabilities for forming electronic mail networks between mainframe sites. Emc2 also includes a programmer interface that provides application subroutines and user exits that communicate with Emc2.

Release 2.4 now provides integrated support for the IBM Personal Computer and compatible machines. Personal computer users can reportedly access all Emc2 mail and calendar features from their micros and download mail and documents from the Emc2 data base, the vendor said.

Emc2 Release 2.4 is priced from \$14,000 for the DOS version to \$18,000 for the OS version.

Fischer-Innis Systems, 4715 Merchantile Ave., Naples, Fla. 33942.

MULTIPLEXERS/
MODEMS

■ Astrocom Corp. has added Extended Access System (Easy) to its Squeeziplexer product line of coaxial and fiber-optic multiplexers for IBM and compatible controllers.

Easy is said to allow a user to double the number of terminals accessing an IBM 3274 controller on a contention basis. The vendor said Easy permits up to 64 terminals to contend for the 32 3274 ports on a session basis using one RG62A/U coaxial cable.

Easy is suited for point-to-point, multidrop or star connection configurations, the vendor said.

The 64-port Easy unit costs \$6,900, the vendor said.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55107.

■ Able Computer, Inc. has announced a multiplexer that reportedly emulates the Digital Equipment Corp. DHU-11 multiplexer for DEC VAX and PDP-11 series computers.

The Able DHU/HS is said to support 16 lines at 38.4K bit/sec. and features on-board flow control to reduce overload on the host.

DHU/HS is said to support high-speed graphics, workstation and terminal-intensive applications. It is reportedly supported by all VAX and PDP-11 operating systems and can be used with several interfaces, including RS-422, RS-232, current loop and Telco Research Corp. Telco Jack, the vendor said.

The DHU/HS is priced at \$3,495 and will be available July 1.

Able Computer, 3080 Airway Ave., Costa Mesa, Calif. 92626.

■ Complexx Systems, Inc. has announced a seven-port, point-to-point statistical multiplexer.

The TX7 reportedly allows seven devices to communicate simultaneously at speeds up to 9.6K bit/sec. by using buffers and data compression techniques. The product is said to correct any errors caused by transmission line noise automatically. The TX7 reportedly features speed and code conversion, allowing devices operating at different speeds and setup parameters to communicate.

The TX7 is compatible with most common Ascii, asynchronous and RS-232 computers and peripherals, according to the vendor. Its composite link can reportedly use any full-duplex synchronous modem at speeds up to 9.6K bit/sec.

The TX7 is priced at \$1,495.

Complexx Systems, 4930 Research Drive, Huntsville, Ala. 35805.

■ Amdahl Corp. has enhanced its line of 2211 time division multiplexers with a high-speed synchronous loop access module (HS Slam) and support for higher speed transmissions.

HS Slam is an integrated limited-distance data set installed with an Amdahl 2211 multiplexer. The product can be used to connect remote devices at up to 32 miles away over four-wire cable. It supports transmission speeds of 56K and 64K bit/sec.

The 2211 multiplexer can also now support channel and trunk rates at speeds up to 768K bit/sec. The higher speed enables users to send video as well as voice and data images, the vendor reported.

HS Slam costs \$900, and a matching remote data set sells for \$700. The channel option, which consists of a channel connector assembly, asynchronous I/O card and interface card, is priced at \$1,660. A fiber-optic trunk costs \$2,000.

Amdahl, Communications Systems Division, 2500 Walnut Ave., Marina Del Ray, Calif. 90291.

LOCAL-AREA
NETWORKS

■ Network Systems Corp. has introduced its AC715 Link Adapter, which provides a gateway from its Hyperchannel network to T1 lines.

Hyperchannel connects a variety of mainframes, mincomputers and various devices on a high-speed network, the vendor said. The AC715 Link Adapter adds full-duplex operation, data buffering and a continuous protocol to the Hyperchannel for T1 link gateway capabilities.

A vendor spokesman said that the product will sustain 80% line utilization for full-duplex file transfers at speeds up to 2M bit/sec.

AC715 Link Adapter costs \$40,000.

Network Systems, 7600 Boone Ave. N., Minneapolis, Minn. 55428.

■ Process Software Corp. has announced a version of its FTP file transfer software to run under Digital Equipment Corp.'s RSX-11 operating system.

FTP conforms to TCP/IP, a U.S. Department of Defense standard protocol for Levels 3 and 4 of the International Standards Organization's

Continued on page 102

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The 5540 terminal from Teletype Corporation is ideal for 3270 protocols, agrees with your pocket-book and gets along so well with people that you'll wonder how you got along without it.

As our third generation of 3270-compatible terminals, the 5540 represents an even better value than its predecessors. Besides being competitively priced, the 5540 supports 3270 SNA/SDLC in addition to 3270 BSC line protocols.

The 5540 also has a more powerful microprocessor-based controller that will cluster up to 32 devices, including our letter quality printer. We also offer a tabletop controller that will cluster up to 12 devices.

Available with standard and reduced size displays, 4-color capability and 80 or 132 column formats, the 5540 can be tailored to your specific needs. And, each display has a smudge-resistant, non-glare, high resolution tilt screen.

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Backed by our experience in building over 300,000 3270-compatible terminals, the 5540 is building a strong record for reliability. If problems occur, self-diagnostics pinpoint them.

You'll find our 5540 terminal is very easy to like.

If you'd like to get to know it a little better, write:
Teletype Corporation, 5555 Touhy Ave., Dept. 3223-F,
Skokie, IL 60077. Or call 1 800 323-1229, ext. 501.

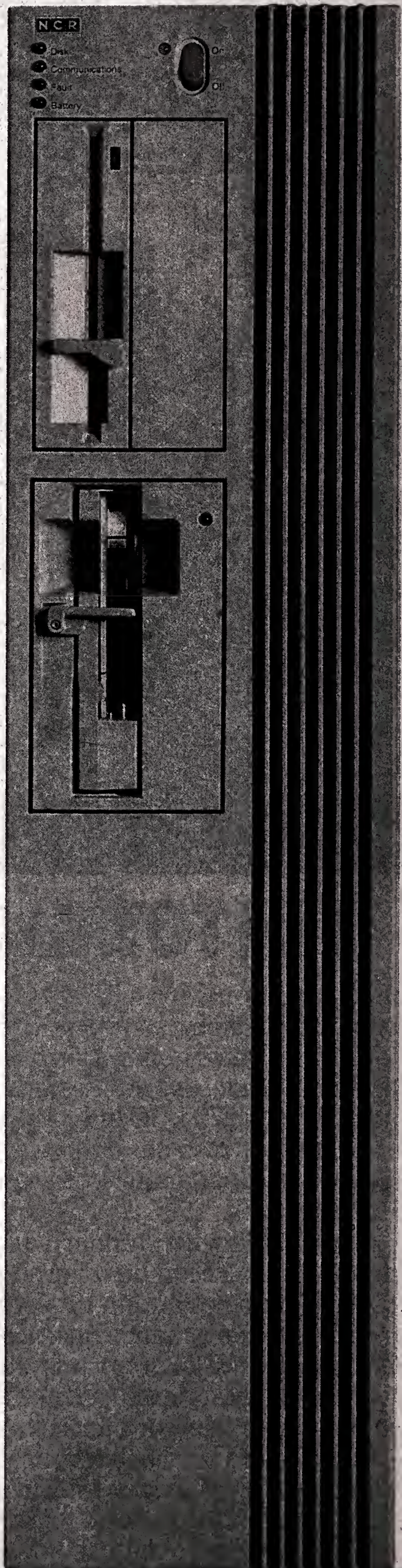
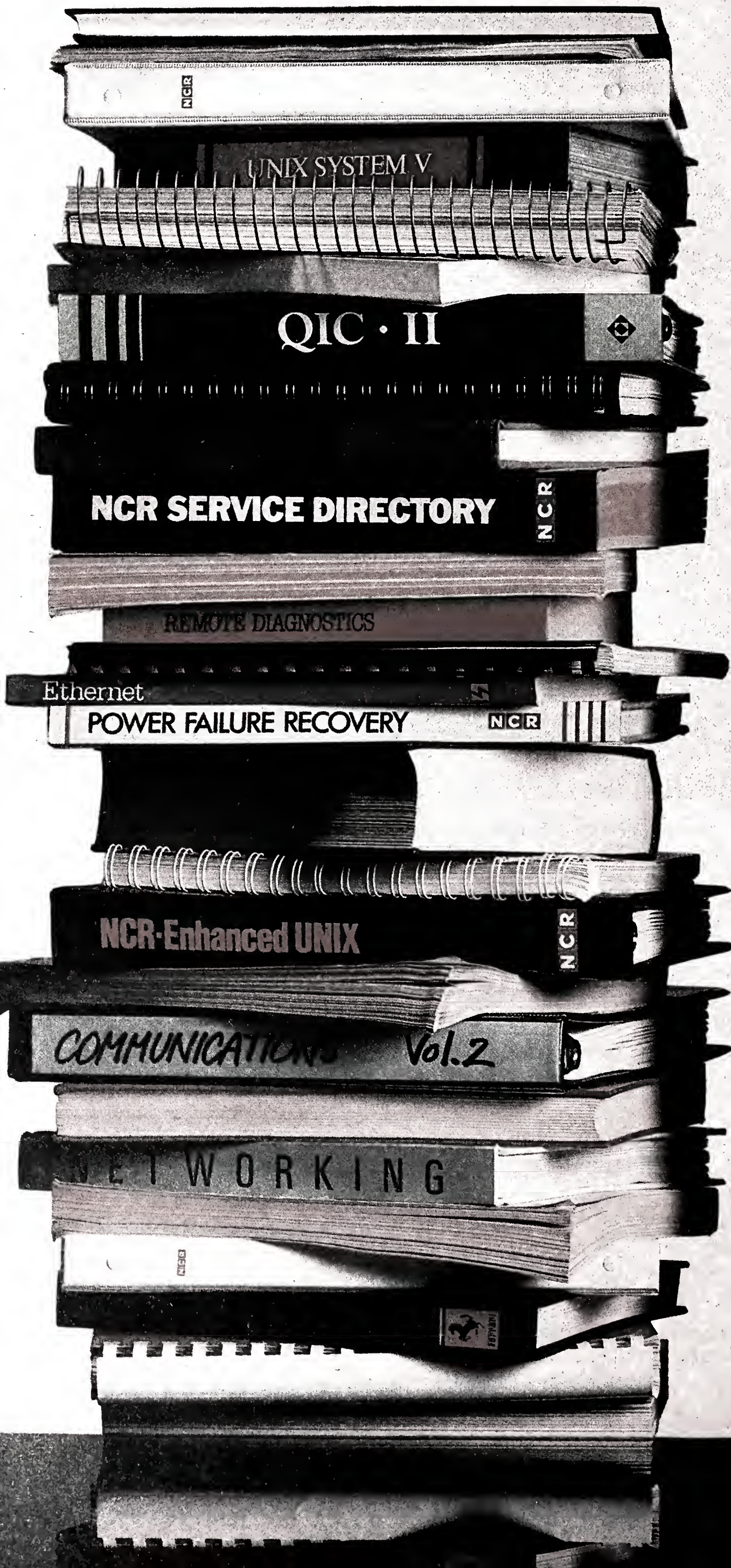
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AT&T

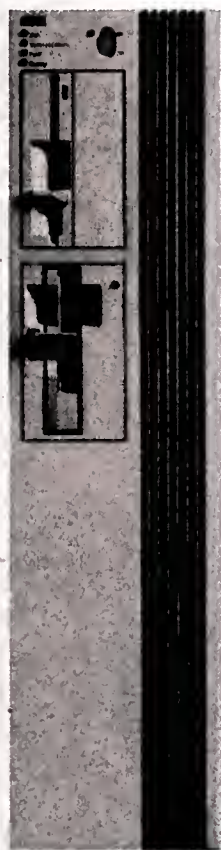
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TOWER XP. THERE ARE OTHERS IN THE CLASS, BUT THEY'RE JUST HERE TO LEARN.

The most popular school of thought in the computer industry today holds that a computer system's value is directly proportional to the number of bells and whistles tacked onto it.

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**TOWER XP.
BUILT FOR SYSTEMS BUILDERS
BY NIT-PICKING FANATICS.**

NCR

OEM Systems Division

COMMUNICATIONS

Continued from page 98

network architecture model. File transfers can be initiated by a user or automatically from a command file, the vendor reported.

The package operates with DEC Deuna or Deqna Ethernet network controllers. The product runs under DEC RSX-11M, RSX-11M-Plus, Micro/RSX and IAS operating systems. FTP also runs on controllers from Proteon, Inc., which makes Pronet.

FTP costs range from \$2,000 to \$6,000 for each CPU on a network.

Process Software, P.O. Box 746, Amherst, Mass. 01004.

NETWORK SERVICES

■ MCI International (MCII) has an-

nounced that it will provide access to Intelsat Business Service (IBS) beginning in the third quarter of this year.

IBS allows customers to transmit digitized voice, data, facsimile and video signals at rates of 56K bit/sec. and higher.

MCII will initially offer service to the UK, West Germany and Ireland. Negotiations are under way to extend service to the Netherlands, France, Italy and Sweden, according to the vendor.

MCI Communications, 1133 19th St. N.W., Washington, D.C. 20036.

■ Western Union, Inc. has introduced Electronic Mail System (EMS), software that runs under IBM's OS operating system and enables mainframe systems to access Western Union's Easylink electron-

ic mail system.

In addition to sending messages via Easylink, users can send messages to subscribers via other Western Union services, including Easylink mailbox, Telex I, Telex II, Mailgram and Express Document, Western Union said.

EMS is said to enable users to route messages to specific IBM terminals, printers or applications. The service features on-line directory, forms generator, security features and audit trail, according to the vendor.

A site license for the software costs \$9,500 or \$10,500 for IBM's OS operating system. Hardware costs an additional \$3,700, according to the vendor.

Western Union News Bureau, One Lake St., Upper Saddle River, N.J. 07458.

ALTER from page 93

every time there is a link or network outage, particularly in banking and financial industries.

The second approach for coping in the postdivestiture era involves a conscious philosophical shift by network planners and general management to build in resource redundancy.

The higher initial cost is accepted as a trade-off for reliability and for a more comprehensive measurement of financial efficiency. Here the real cost to the organization is the sum of the network cost and the revenue loss due to outages; the optimization criterion is that of minimizing the overall cost.

This unorthodox approach may require a redefinition of budgeting strategies. Clearly, in this scenario, the budget of the communications department must be enlarged to accommodate the cost of additional facilities, and the budget of users adjusted accordingly.

Notwithstanding the shift this ap-

”

The higher initial cost is accepted as a trade-off for reliability and for a more comprehensive measurement of financial efficiency.

proach implies, the organization as a whole should benefit in the long term from reliability in network-supported business revenue, productivity gains and user satisfaction.

At the technical level, this approach may involve the following:

■ Spare local loops brought on-line by patching equipment and other redundancy for critical paths.

■ High-connectivity packet networks — having at least two or three links serving each city in the backbone net — with ability to route around problems.

■ Diagnostic equipment, which may actively point to problems for early resolution.

■ Existing and emerging customer-controlled rearrangement facilities such as digital access cross-connect systems.

■ Network simplicity dominating network cost.

As an example of the last point, in a previous affiliation this author was asked to design and implement a simple network connecting a South Pacific nation to New York. From a reliability point of view an international record carrier line from New York directly to the South Pacific through San Francisco would have been optimal.

Because of a modest cost differential, the intended user preferred to employ a circuit that ended up involving a local loop, 10 modems, three international lines, one domestic long-haul line in the foreign country, two multiplexers and a message switch. The propagation time, the retransmission time and the discrete components' processing time would be enough to raise serious doubts about the system's long-term integrity.

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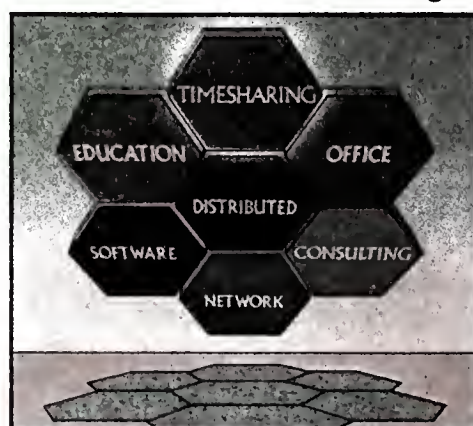
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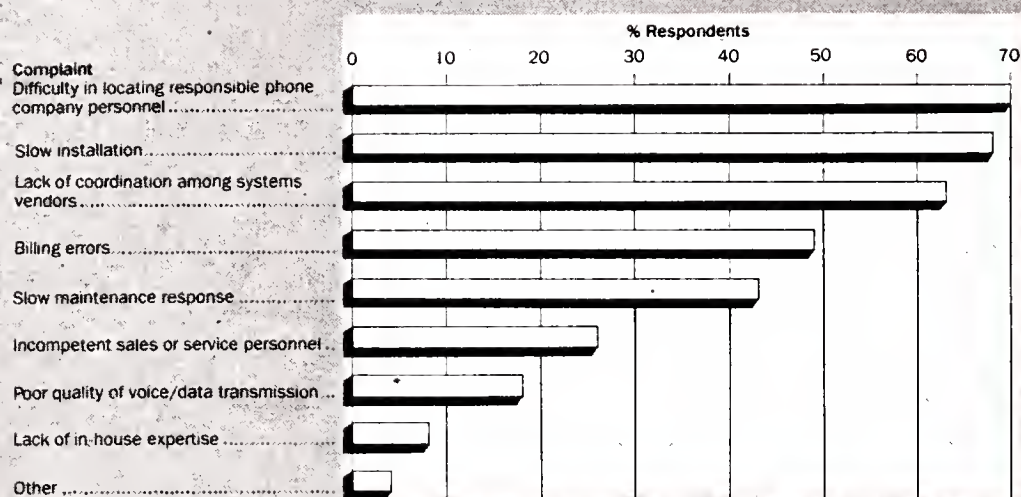
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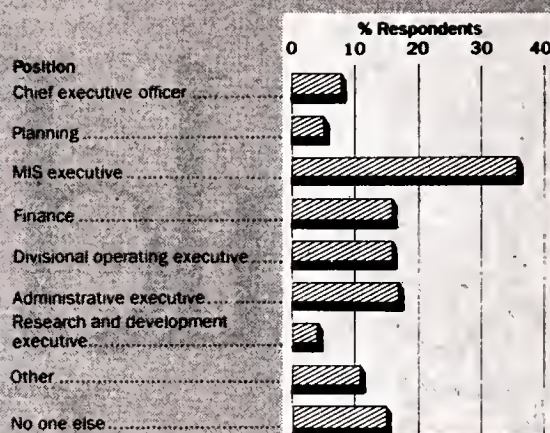
(Multiple responses)



Source: The Conference Board, Inc.

Responsibility for telecommunications planning

(Shared with telecommunications manager)



Source: The Conference Board, Inc.

POLL from page 93

sibility to a different part of the organization. Communications is becoming a high-level management concern. A quarter of the companies moved their communications function higher up the corporate ladder. Only one company in 12 placed that function directly below a chief executive officer. MIS managers are most often charged with overseeing telecommunications. Respondents were unhappy with AT&T's service since divestiture. The most widely voiced complaint was finding the right person to solve a

problem.

The report is available to Conference Board members for \$15 and to nonmembers for \$35. The Conference Board is located at 845 Third Ave., New York, N.Y. 10022.

SERVICES from page 93

If the recalled number is busy, Lass retries the number every 40 seconds for half an hour. If the called party answers within that time, the originator is notified with a distinctive ring.

■ **Selective call forwarding.** This enables users with standard call forwarding to select calls to be routed to another location. To use the feature, users dial *63 or 1163 and enter the numbers of the calling parties whose calls will be forwarded.

■ **Distinctive ringing.** By entering the telephone numbers of calling parties in the same manner as selective call forwarding, users can assign distinctive rings to certain callers.

■ **Nuisance-call rejection.** As its name implies, customers can use this feature to block nuisance calls after they happen by hanging up and dialing *60 or 1160. Future calls from that number will be greeted with an announcement saying the call cannot be completed at the customer's request.

■ **Customer-originated trace.** Drawing from nuisance-call rejection capabilities, users can also initiate call traces by dialing *57 or 1157. This routes the nuisance caller's number to the appropriate authorities where it is either stored in memory or printed.

■ **Call identification.** With this feature, which requires the addition of a small display device, users can identify the telephone numbers of callers. This capability could be enhanced, the "Record" reported, to enable business customers to direct incoming calls to a computer that could display the number of the calling party as well as other customer information.

■ **Bulk identification.** The former capability only identifies the caller's number while the call is in progress, but with bulk identification, business users can create a permanent log of incoming calls. This can be used to aid security by denying access to computer resources from certain numbers.

Charges for these services are based on usage rather than on a flat monthly fee. Some of the services, however, require the lease or purchase of additional hardware.

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SYSTEMS & PERIPHERALS

Adage unveils DEC-compatible color display workstations

Models target imaging, CAD/CAM applications

BILLERICA, Mass. — Adage, Inc. has announced three configurations of its Adage 3000 Color Raster Display System workstation that is used in conjunction with Digital Equipment Corp. PDP-11 or VAX-11 series processor under DEC's VMS operating system.

The Adage 3110 system was designed for computer-aided design and manufacturing and seismic applications, the vendor said. It includes a 1,024- by 1,024-pixel image, with more than 65,000 colors, and includes a 16-bit buffer.

The unit is expandable to a double-buffered 1,024- by 1,024-pixel by 24-bit image memory, 3M bytes of display list memory and 8K bytes of microcode memory, the vendor said.

The 3130 system is said to be useful for imaging and graphics applications. It includes a local graphics processor, 1M byte

of display-list memory and quad-buffered 1,024- by 1,024-pixel by 8-bit image memory.

The image memory is software reconfigurable for 512- by 512-pixel full-color display with 256 overlay colors. Real-time video input is optional.

The 3140 system is designed for applications requiring real-time simulator display capabilities. It combines local graphics and transformation processors with a graphics generator module.

The 3140 is used with Adage's IDL2 software for display updates in response to changes in the simulator model, the vendor said.

The 3110 and 3130 systems, including Adage's FSS 3000 Fortran subroutine package and either its Seismic 3000 or Solid 3000 software, are each priced starting at \$49,400.

The 3140, including IDL2 software, costs \$58,200 and up.

More information is available from Adage, One Fortune Drive, Billerica, Mass. 01821.

Firm offers multiuser OA system

By Kathleen Sullivan
CW West Coast Bureau

SANTA CLARA, Calif. — Sensory, Inc., a fledgling company based here, has unveiled its first product, the Sensory Office System, a multiuser system said to provide voice, data and communications capabilities.

The Sensory Office System, which can support up to 32 users, is based on a proprietary operating system. At the heart of the system is the Sensory 5000, a network control unit built around two Intel Corp. 8086 microprocessors.

Sensory's workstations, which also include 8086 microprocessors, feature 512K bytes of random-access memory and 8K bytes of read-only memory. They can be attached to the controller via coaxial cable, the company said.

The system is said to include Sensory's

See **FIRST** page 109

■ XYVision unwrapped an enhanced version of its line of turnkey integrated publishing systems/**106**

■ A tridensity ½-in. streaming tape drive was unveiled by Kennedy Co./**106**

INSIDE

Turnkey Systems/**106**

Data Storage/**106**

Terminals/**106**

Printers/Plotters/**106**

Hybrid process doubles speed of Hitachi chip

Hi-Bicmos method keeps chips from overheating

SAN JOSE, Calif. — Hitachi America Ltd. has announced a static random-access memory (RAM) chip that can hold 64K bits of memory — roughly 12,000 words — and has an access time of 25 nsec.

Previously, the company's fastest chip was the HM6287-45, with an access time of

45 nsec, a spokesman said.

The company integrated the bipolar process, which delivers high speeds but causes the chips to overheat, with the lower power Cmos process for what Hitachi is calling the Hi-Bicmos process. The process is said to operate at top speeds with power consumption of a few hundredths of a watt.

Hitachi expects the HM6787 static RAM chip to be useful in graphics workstations, computer-aided design and manufacturing

systems, mainframe computers used in data base applications and computers used by banks, airline reservations and electronic publishing systems.

The HM6787 cost \$68.50 each in quantities of 10,000, the vendor said.

The product will be available in fourth-quarter 1985.

More information on the static RAM chip can be obtained from Hitachi America, located at 2210 O'Toole Ave., San Jose, Calif. 95131.

Integration snags slow automation



SHOP TALK

George Allen

Although "factory automation" has become a common buzzword, the automated factory is almost nonexistent. This is because the heavy up-front costs and complex tasks that must be handled make automating factories a difficult and expensive proposition.

True factory automation involves many elements, including: robotics; computer-aided design, manufacturing and engineering (CAD/CAM/CAE); direct numerical control of machine tools; simulation of factory flows; material requirements planning (MRP); inventory management and distribution; and a host of other capabilities. The problem is integrating all of these elements, tying them into a centralized data processing environment. Communications, data base management systems and applications soft-

ware hold these components together.

There are several major efforts under way that attempt to combine the powerful capabilities needed to approach factory automation. Many of the most significant advances are evolving out of CAD/CAM/CAE for use in such applications as automating the design and fabrication processes, which include sophisticated direct numerical control operations and robotics.

In order to become useful, factory automation will have to include richer and more complete product modeling, including solid modeling and the ability to store the geometry of the part fully in the computer. Other major trends will be the improvement in graphics devices and workstations and the emergence of telecommunications as a major component in the total system.

If automation is to work in a factory, the software community must adopt open systems architectures. If this happens, the death knell of closed turnkey systems will sound.

Closed turnkey systems, the hallmark of many second-generation CAD/CAM offerings, use special-purpose computers running operating systems dedicated to the CAD/CAM function. Such systems feature special-purpose terminals and closed data bases, making their use beyond the scope of the CAD/CAM environment ineffective,

See **AUTO** page 109

IBM rolls out factory systems

BOCA RATON, Fla. — IBM has introduced the 7531 and 7532 industrial systems, based on Intel Corp.'s 80286 microprocessor.

The 7531 operates as a floor-standing unit, while the 7532 is a rack-mountable version. The systems are functionally identical and are said to provide protection against temperature extremes, vibration and shock, voltage transients and particulate contamination, IBM said.

The systems were designed for industrial applications, such as machine monitoring, production control and distributed numerical control. Both models are equipped with a removable filter for dust collection and cooling fans said to protect the power supply and system components.

Standard features include 512K bytes of main memory, expandable to 3M bytes, a 1.2M-byte diskette drive and seven expansion slots.

Options include a double-sided diskette drive that permits exchange of 320K- and 360K-bit diskette media between the 7531, 7532 and the previously announced 5531 industrial computer and IBM Personal Computers, the company said.

The 7531 costs \$6,145 and the 7532 costs \$6,370, according to the vendor. Both will be available in the third quarter.

IBM, Manufacturing Systems Products division, P.O. Box 1328, Boca Raton, Fla. 33432.

Allen is a computer-aided design and manufacturing specialist with the McDonnell Douglas Manufacturing Industry Systems Co., a network management products vendor.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

■ **XYVision, Inc.** has unwrapped Release 4 of its line of computer-integrated publishing systems.

The Release 4 line reportedly includes a Level 100 system for commercial and in-plant production for text editing and composition with pagination and file management.

The Level 100 system, including hardware and software, starts at \$49,000. It includes two XYText terminals, 2M bytes of memory, a 70M-byte disk drive, a 1.6M-byte floppy drive, a typesetter interface and a single RS-232 communications port.

The Level 300 system provides interactive page make-up facilities, excluding batch processing. It costs \$79,000 and reportedly contains one XYView terminal, a 70M-byte disk drive, 3M bytes of memory and a dot matrix printer.

The Level 1000 system for text handling costs \$90,000 and provides an XYView terminal, an XYText terminal, 6M bytes of memory, a 70M-byte drive, a 9-track tape, a dot matrix printer and eight RS-232 communications ports. An optional laser printer costs approximately \$15,000.

The largest system, the Level 3000, includes one XYGraphix terminal with tablet and puck and one XYText terminal, 8M bytes of memory, a 70M-byte disk drive for text and a dedicated subsystem 300M-byte drive for graphics, a 9-track tape, the laser printer, batch and interactive software, graphics editing software and a scanner interface. It costs \$165,000.

XYVision, 52 Cummings Park, Woburn, Mass. 01801.

DATA STORAGE

■ **Kennedy Co.** has announced the Model 9600A tridensity ½-in. streaming tape drive. The unit is said to operate at 800, 1,600 or 3.2K bit/in. and can record data at 45 in./sec. in a start-stop mode and 100 in./sec. in a streaming mode.

The unit features an 8¾-in. profile, horizontal mount with front tape insertion, autothreading and auto-loading to the beginning of tape marker, and the field engineering panel for diagnostics, the vendor said.

The 9600A incorporates capstan and tension arms for tape positioning. The unit costs \$5,400 in single quantities, with discounts for OEM quantities.

Kennedy, 1600 Shamrock Ave., Monrovia, Calif. 91016.

TERMINALS

■ **Daisy Systems Corp.** has announced the Boardmaster design system, a workstation for designing printed-circuit boards. The unit runs on Intel Corp. 80286 microprocessor-based Daisy hardware.

The Boardmaster performs a range of printed-circuit board engineering and layout functions, a spokesman said. It includes general-purpose drafting facilities for the creation of final manufacturing drawings and performs component packaging, selecting components in a way that minimizes parts count.

Other features are an 80M-byte hard disk drive, a 19-in. color monitor and a bit-slice-based graphics ac-

celerator. Boardmaster is compatible with the firm's Logician, Gatemaster and Chipmaster workstation lines.

The system is available as either the full-function, single-user Boardmaster or the dual-user Boardmaster-D, which houses two workstations in a single cabinet.

Th price for Boardmaster, scheduled for September availability, is \$110,000. The Boardmaster-D costs \$140,000, the vendor said.

Daisy Systems, 700 E. Middlefield Road, Mountain View, Calif. 94039.

■ **Esprit Systems, Inc.** has announced its ESP 6515 video display terminal, which emulates Digital Equipment Corp.'s VT220 terminal and is compatible with all DEC VT100 applications software.

The unit includes a 14-in. monitor, a tilt and swivel display, support of the VT100 Graphics and national character sets and 18 user-programmable keys that are shiftable to provide 36 functions.

The terminal costs \$795.

Esprit Systems, 100 Marcus Drive, Melville, N.Y. 11747.

■ **Xpoint Corp.** has announced an IBM 3178-compatible terminal with an optional Ascii printer port for IBM 3287 emulation.

The Xpoint 178 is a 12-in. CRT that is coaxial plug-compatible with an IBM 3178 or 3278 model 2 terminal and an IBM 3278 typewriter-style keyboard. An Ascii printer port, which will allow any serial or paral-

lel Ascii printer to perform 3287 emulation, is available on a model called the 178P.

The Xpoint 178 costs \$1,295, and the 178P with printer support is an additional \$1,495.

Xpoint, Suite 130, 5600 Oakbrook Pkwy., Norcross, Ga. 30093.

■ **GTE Telenet Communications Corp.** has released a network color graphics monitor for its Telenet system.

The Color Monitor views network operations with color graphics. Configuration, traffic levels, line performance and other operating parameters appear in a variety of geometric shapes and numbers as well as in solid, dotted and flashing lines, the vendor said.

The monitor costs \$52,000 for the color CRT, keyboard and network management software.

GTE Telenet Communications, 12490 Sunrise Valley Drive, Reston, Va. 22096.

PRINTERS/PLOTTERS

■ **CIE Terminals, Inc.** has introduced enhancements to its currently offered CI-300 (300 line/min) and CI-600 (600 line/min) printers.

The CI-300+ and CI-600+ printers will retain the performance and features of the older models they are replacing. CIE will continue to support the CI-300 and CI-600 models.

Continued on page 108

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- BIMMONTR** — DOS/VSE System Status, Performance Measurement, and POWER Queue display.
- BIMSUBMT** — On-line Job Edit and Submission facility.

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AST RESEARCH INC.

SYSTEMS & PERIPHERALS

Continued from page 106

Enhancements include a print head mechanism that employs fewer moving parts and is said to result in extended ribbon life. The CI-300+ and CI-600+ models also include an RS-232C data transfer rate of 19.2K bit/sec.; a serial receive buffer size increase from 448 bytes to 4K bytes; and RS-232C communications protocol compatibility. Synchronous data communications protocols are available as options.

The CI-300+ printer costs \$4,495, and the CI-600+ printer costs \$6,795.

CIE Terminals, 2505 McCabe Way, Irvine, Calif. 92714.

■ General Business Technology, Inc. has introduced a 200 char./sec. matrix printer for IBM System/34, 36 and 38 CPUs.

Called the 5222DP, the unit prints near-letter-quality output at 50 char./sec. It features an adjustable tractor feed with tear bar, an automatic single-sheet document feeder, bidirectional printing and user-programmable or host-selectable character fonts and styles. It also offers emphasized and/or double-strike printing and super- or subscripts.

The printer costs \$2,995.

General Business Technology, 1891 McGaw Ave., Irvine, Calif. 92714.

■ Kearsarge Industries, Inc. has released a serial/parallel version of its SX-60 multichannel switch/spooler which will connect four IBM Personal Computers to Centronics Data Computer Corp. parallel printers.

The SX-60 serves up to four computer systems and feeds two printers. Any of the input systems can direct its output to either of the printers. Spooler buffer sizes of 8K, 32K or 64K bytes store from 2½ to 20 pages of dense, single-spaced text. Expansion boards can increase the spooler's buffer capacity to 512K bytes and 160 pages.

The standard configuration for the SX-60 is four serial computers in, two parallel printers out.

Prices start at \$499 for an 8K-byte buffer size to \$629 for 64K-byte buffer storage.

Kearsarge Industries, 12310 Pinecrest Road, Reston, Va. 22091.

■ Spur Products Corp. has released an adapter that makes IBM 3211 or compatible impact printers and the Xerox Corp. 8700 laser printer compatible with IBM's System/34, 36 or 38.

The USA/Twin-Ax Universal Subsystem Adapter gives the system the capability of printing up to 3,000 lines of shaped characters per minute with a 3211 or

compatible printer or up to 9,240 lines of dot matrix non-impact printing with a Xerox 8700 laser printer.

The adapter costs \$6,000.

Spur Products, 13469 Beach Ave., Marina Del Rey, Calif. 90292.

■ Dataproducts Corp. has introduced a shared resource, color dot matrix printer with 400 char./min draft mode speed, 100 char./sec. text-quality

speed and 50 char./sec. near-letter-quality speed.

Graphics on the Dataproducts 8250 are produced with a resolution of 240 by 240 dot/in. at a speed of 10 in./sec. Options allow users to store a combination of continuous forms, cut sheets and envelopes or labels within the unit and to switch from printing on one kind of paper to another within 30 seconds. A single bin paper cassette allows cut sheets to be fed automatically.

The basic 8250 costs \$2,650 (\$1,900 in OEM quantities of 100). Options cost \$425 (\$275 in OEM quantities) for the single bin paper cassette and \$975 (\$730 for OEM quantities) for the paper express feature.

Dataproducts, 6200 Canago Ave., Woodland Hills, Calif. 91365.

■ Optical Computer Systems, Inc. has announced the Model 928 Drafting

Plotter, featuring an eight-pen carousel and capable of accepting drafting media up to E size.

The Model 928 allows the operator to select roller ball, fiber-tip or liquid drafting pens in varying colors and line widths. Different types of media can be used.

The Model 928 uses RS-232 and IEEE 488 interfaces. The product costs \$13,600.

Optical Computer Systems, 2860 Wilderness Place, Boulder, Colo. 80301.



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SYSTEMS & PERIPHERALS

FIRST from page 105

proprietary Voicenotes feature, which allows users to embed voice comments in documents. Users insert voice notes into document files by speaking into a phone. A symbol then appears on the document indicating a note has been recorded.

In a standard configuration, Sensory's system includes Voicenotes, which can be used for standard voice

messaging, and a variety of integrated applications, including telephone management, dictation, electronic mail and word processing.

Options include Microsoft Corp.'s Multiplan, a document processing program with form generating capabilities, a spelling checker and IBM's Binary Synchronous Communication 2780/3780 communications protocol. An IBM Personal Computer can be attached to the network through an RS-232

port, allowing users to transfer Ascii files between the Personal Computer and the Sensory Office System, the company said.

The Sensory 5000 controller is available in two basic configurations. A 16-user system with 56M bytes of formatted disk capacity, expandable to 112M bytes, sells for \$22,995. A 32-user system with 150M bytes of disk capacity, expandable to 300M bytes, sells for \$30,995. Each includes a

13M-byte cartridge tape drive for archiving, two asynchronous serial ports, two asynchronous/synchronous ports and two intercontroller communications ports, the company said.

The standard workstation costs \$4,495, while a workstation with telephony equipment costs \$4,895. Shipments are scheduled to begin in July.

Sensory is located at 2175 Martin Ave., Santa Clara, Calif. 95050.

AUTO from page 105

inefficient and often impossible.

Open systems architectures, on the other hand, form part of a new generation of systems, which may become the building blocks for true factory automation.

Today's CAD/CAM/CAE systems rely on general-purpose computers and standard operating systems that allow specialized software to run alongside other applications. Terminals are usable for other applications because they are standard, off-the-shelf items or are provided with driver software.

One option that may improve integration of factory systems is compliance with the Initial Graphics Exchange Specification (Iges) and other exchange format standards to facilitate transfer of data between dissimilar systems without an uncontrolled proliferation of custom translators. Third-party access to a CAD/CAM data base can be supported through Iges or a direct subroutine interface. Access to workstation hardware and other utility packages can also be provided.

Telecommunications in CAD/CAM is growing in importance and will be increasingly essential to total factory automation solutions. With the advent of newer and better system architectures and the shrinking system footprint, it is becoming advantageous to distribute computer power for CAD/CAM and other applications.

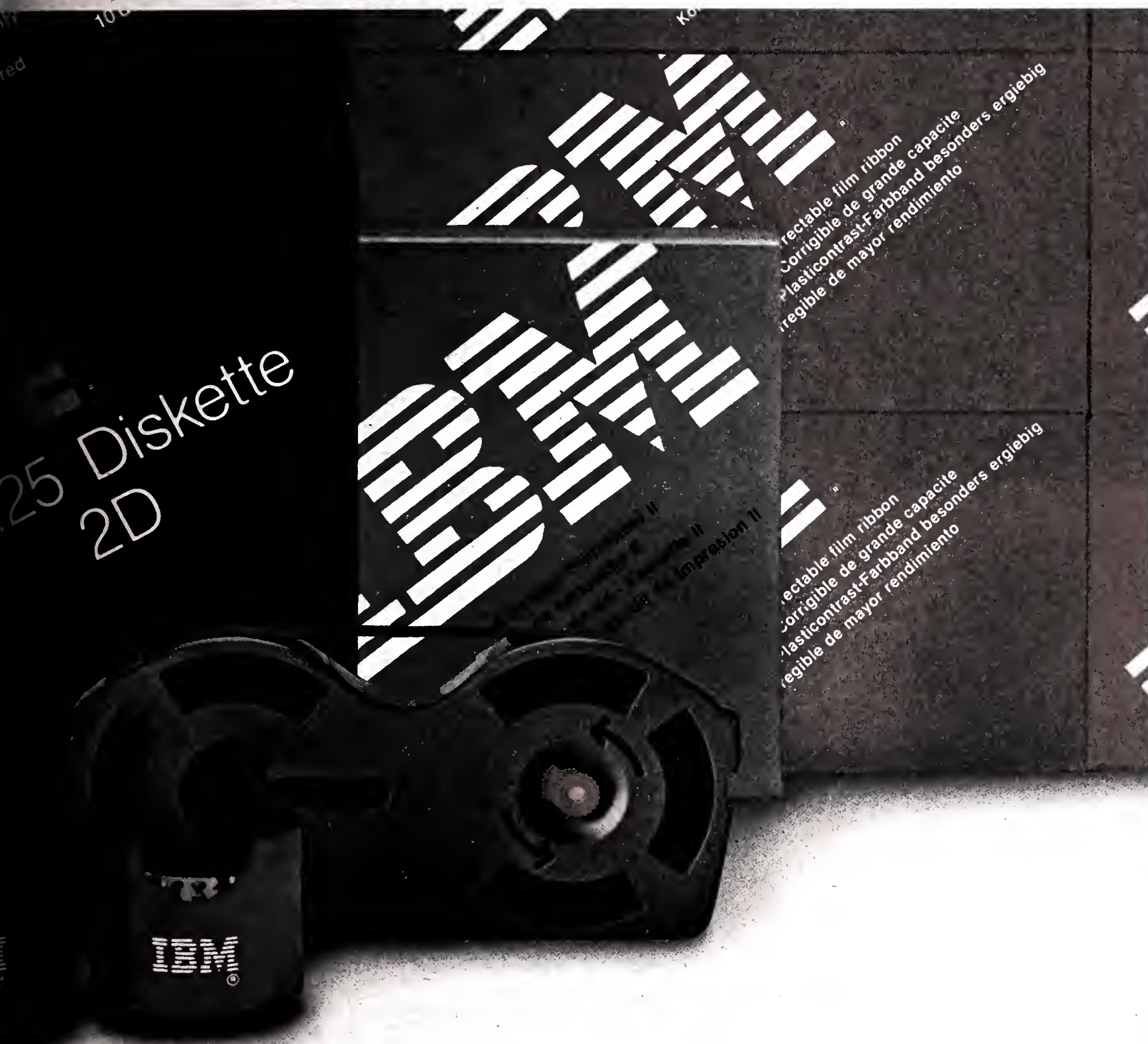
Communications key

Communications with other data processing organizations and functions within the corporation is also a necessary requirement in maintaining open systems. CAD/CAM must be able to interface with a DBMS or management information system, as well as with MRP and bill of materials systems.

One means of assuring smooth integration of telecommunications — and thereby maintenance of an open systems environment — is adherence to the seven-layer Open Systems Interconnect model established by the International Standards Organization.

The nature of factory automation and its components will continue to be defined and refined throughout the '80s. As the vendor community pushes back the boundaries of automation with integrated systems, the equally forward-looking user will adopt management processes and select products and services that fit into his strategic vision of the future.

The convergence of these two efforts will produce the de facto automated factory as a logical extension of today's CAD/CAM systems.



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COMPUTER INDUSTRY

The Yankee Group: Age and experience a plus

Market research companies are increasingly called upon to analyze the myriad product announcements and shifting business strategies of the computer industry. This week, Computerworld begins a five-part series profiling a handful of prominent market research firms.

By Peter Bartolik
CW Staff

BOSTON — Despite its relatively advanced age of 15, the Yankee Group, Inc. exploits an image of the brash, aggressive kid on the increasingly crowded block of market research and consulting houses.

Ignoring younger contenders, Howard Anderson's firm positions itself with the heavyweights of an earlier generation and sells itself as the provider of analysis and insight that adds value to factual data pro-

vided by others.

When he started out as a one-man operation in 1970, Anderson lied about his age, he said in a recent interview, because "who the hell wants to hear from a 25-year-old, a punk in pinstripes out of the Harvard Business School." Approaching age 41 in an era where young people with MBAs are a mainstay of the industries the Yankee Group covers, Anderson said he does not "have to put gray in my hair anymore," but he actively cultivates the image of the upstart competitor providing something more than the numbers that older firms crank out.

Commenting on the competition, Anderson positions his company with Dataquest, Inc. and International Data Corp. (IDC). Dataquest, according to Anderson, "has

See MART page 112



Apple revamps for stability

By Kathleen Sullivan
CW West Coast Bureau

CUPERTINO, Calif. — With its recently announced reorganization, which included the demotion of its cofounder, Steven P. Jobs, Apple Computer, Inc. has taken a series of long-overdue steps to bring stability to its troubled operations, analysts said.

Industry observers applauded the company's moves. "John Sculley [Apple's president] and the board have moved to solidify the firm and make it more stable," said Tim Bajarin, an industry analyst with Creative Strategies Research International, a San Jose, Calif.-based market research firm. "It should have happened a long time ago."

See APPLE page 123

Tandon wins first round

WASHINGTON, D.C. — Tandon Corp. has won the first round against three Japanese vendors that Tandon claims infringed on its patents for double-sided microcomputer floppy disk drives in products the Japanese firms imported into the U.S.

Administrative law Judge Sidney Harris recommended May 30 that Tandon be granted temporary relief from the impact of imports from Sony Corp., Mitsubishi Electric Corp. and Teac Corp. If the recommendation is upheld by the International Trade Commission (ITC), the three Japanese firms would be required to post a financial bond with the U.S. Customs Service on every shipment of floppy drive

See TANDON page 122

National Semi to cut staff 3.5%

By Clinton Wilder
CW Staff

SANTA CLARA, Calif. — In one of the most drastic work force reductions of the current semiconductor industry slump, National Semiconductor Corp. announced last week that it will lay off 1,300 U.S. and European employees during the next few months.

The company said the layoffs, its largest substantial work force cut of the current slump, will affect all levels of employees. The cut affects 3.5% of National Semiconductor's 37,000-member work force worldwide but a much higher percentage of its domestic and European employees. Approximately 600 people will be dismissed from the company's world headquarters, based here.

National Semiconductor also said it has scrapped plans to build a wafer fabrication plant in Portland, Ore. The company blamed both announcements on the lack of signs of recovery from the severe semiconductor industry downturn that began last year.

"The reality is that semiconductor market conditions have not shown significant improvement for the past year," said Charles E. Sporck, National Semiconductor's president and chief executive officer. "We now must come to grips with this fact and adjust the corporation's cost structures to reflect the current market conditions."

Sporck said layoffs were a last resort after the company had tried to cut costs over the past several months through plant shutdowns, a wage freeze and reductions in capital expenditures.

Earlier this year, National Semiconductor laid off 400 Salt Lake City employees and has been running a four-day work-week schedule at all European and North American facilities since mid-March [CW, March 18].

See LAYOFF page 123

■ Memorex and Control Data recently announced cost-cutting measures/113

■ Lotus 1-2-3 warranty: Don't look now!/116

■ AT&T recently announced a videotex venture in partnership with Chemical Bank, Bank of America and Time/118

■ Honeywell's third-party service organization signed up an additional vendor, this time agreeing to provide maintenance for Convergent Technologies hardware/122

Good news and bad news from the industry grab bag



INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

Although President Reagan's tax reform proposal contains generally good news for the computer industry, let's not forget that the ball now moves into the most divisive court of all — the U.S. Congress.

On the positive side, the proposal keeps computer depreciation schedules at five years, in contrast to an earlier proposal for writing off the expense in eight years; the capital gains provisions will maintain incentives for investing in new companies; and the R&D credit was extended for three years.

On the downside, some would

say, is the proposed elimination of the investment tax credit. But good investments pay off, bad investments don't. Investment brings its own reward or punishment, depending on whether good or bad business decisions were made.

However, the White House has opened the doors to tinkering with the plan. By making certain concessions, such as to the oil industry, the proposal makes it that much harder for Congress to stand tall against "me too" demands from other industries. And a basically populist Congress is certain to shift more of the reform benefits to the middle class, further enhancing the climate for tinkering.

My, my, how forthcoming IBM is this year about earnings projections. At the end of May — for the

third time in recent months — Big Blue issued a statement forewarning bad news.

The statement's missives, certainly out of character, hint of a damage control campaign. With the likelihood of two disappointing quarters under its belt and no indication as yet of an upturn in the industry, the prospect of IBM turning things around in the second half of the year seems to be fading.

Sterling Software, Inc. recently said that its data storage management system, DMS/OS, was selected as the standard disk management software system for all General Motors Corp. and Electronic Data Systems Corp. (GM's subsidiary) data centers. The contract gives GM and its subsidiary the right to install DMS/OS in all of their DP sites,

Sterling Software said.

Genix Corp., the spin-off profit center and former part of National Steel Corp. [CW, May 20], recently announced it was granted an exclusive license to market the Pro-gramaster applications development package by Master Software, Inc. on a remote processing basis.

On the leasing side of things, privately held Capital Associates International, Inc. of Boulder, Colo., recently announced a \$40 million revolving credit facility with the Mellon Bank, along with the participation of the First National Bank of Minneapolis and the Colorado National Bank of Denver. The credit facility will be used for working capital purposes and the short-term financing of equipment leases.

COMPUTER INDUSTRY

AT A GLANCE

the YankeeGroup

89 Broad St., Boston, Mass 02210

Founded - 1970
Employees - Approximately 100
1984 Revenues - \$7.7 million
1984 Profits - \$1.6 million
Specializations - Communications technology



Howard Anderson
The Yankee Group

MART from page 111

said the world is sand — silicon," while IDC takes the tack that main-frame computer installations are what is important. At the Yankee Group, according to Anderson, "we have said, being the new kid on the block, 'No. You're both wrong. The world is a communications link of which there are some interesting peripherals: [IBM] 3083s, memory, micros, minis, office automation, [computer-aided design and manufacturing].'"

Not mentioned was the fast-growing Stamford, Conn.-based Gartner Group, Inc. Locked in a bitter court battle with the Gartner Group over the hiring of a former Yankee employee and charging misappropriation of proprietary information, Anderson is seen by observers to be conducting a feud.

Anderson disdains to rank the Gartner Group in the same league. "We look at Gartner Group as primarily a Wall Street analyst; I mean, Gideon Gartner was a Wall Street analyst, Tom Crotty was a Wall Street analyst, and they know earnings projections or whatever," Anderson said, giving no mention to the technical staff at the Gartner Group.

It is a three-cornered ring in Anderson's view, with Dataquest dominating the semiconductor industry, and IDC dominating the numbers on processor installations. In the communications arena, he said, "we have probably, in our own minds, lapped the field; we have literally forgotten some things that [our competitors] are just discovering."

Anderson delineated a second tier grouping of Arthur D. Little, Inc. and the Stanford Research Center; on a third tier, he said, is the Gartner Group, along with Infocorp, "a growing company we have some respect for," and Quantum Science Corp..

In addition to U.S. offices here, in the Washington, D.C., area and in California's Silicon Valley, the Yankee Group has branched out internationally to the UK, Japan and Australia. The company has about 100 employees, including 10 sales representatives. Anderson claims 425 clients, including "every major vendor and the majority of smart large users."

Although the company is telecommunications focused, research is divided into an Information Processing Group and a Communications Industry Group, both of which offer four services, including a data communications module.

Each client is also provided with an on-line electronic mail and data base service, Yankeenet (also available separately), of which Anderson is particularly proud. "The biggest

point that we are making now is that the smart user is going to extend his network to his suppliers and his customers," he said. "That's what we are doing with Yankeenet."

One client, Kerry Overlan, director of Corporate Telecommunications and Office Automation for United Brands Co., said Yankee Group reports cover the full scope of a particular subject, and he values the option of phoning Yankee Group analysts, including Anderson, to elicit further information.

Additionally, he said, "the seminars in New York are generally good, and I get to meet a lot of other people in different industries." Also,

Yankee Group analysts make presentations at annual meetings of United Brand's international managers, Overlan said.

Mid-life transition

But there are signs that the Yankee Group is going through somewhat of a mid-life transition. Anderson said compound annual growth has begun to slow from the company's historic 60% rate.

Dale Kutnick, who said the firm became a two-man operation when he joined 7½ years ago, earlier this year left his position as director of strategic services after a dispute with Anderson. Since then, he said, five senior people have also departed, including two IBM watchers who signed on with competing companies.

Kutnick said the Yankee Group historically was "able to bring relatively young, inexperienced people in and was able to [develop] them into decent analysts very quickly." With the departures of senior analysts, he added, the question is whether a young staff "can add enough meat" to standard research data.

Anderson countered that "there is a lot of body-snatching going on right now" and said he was in the process of hiring away an IBM analyst from a competitor.

Kutnick, while dismissing Anderson's brashness as a marketing ploy that gains attention, agreed that the firm's strength has been its attempts to find and define new markets.

Another former employee said the staff identifies with Anderson's image. "The corporate culture is very strong; they are somewhat the bad boys in the industry, always willing to offend anyone if the cause is right," said the former employee, who asked not to be identified. But he also said the Yankee Group "needs to put in mechanisms that are a little less Andersonian."

William Rosenberger, Kutnick's replacement and former director of product planning with Wang Laboratories, Inc., views his new company as an aggressive, leading-edge firm

that provides crucial information before products are announced. "It is about like an early warning system of what's happening in the industry," Rosenberger said.

Distancing the Yankee Group from the competition, Rosenberger said, "Some players in this market are people who deal only in market data. Others deal with data and analysis. Yankee is the latter. We do primary research by survey and add a heavy dose of analysis."

The formula has apparently been successful. The Inc. 500 list, which has included the Yankee Group each of the past three years, in December estimated 1983 revenue at \$10.1 million with profits of more than \$1.6 million, estimates with which Anderson initially said he has no serious disagreements.

Kutnick, however, said 1983 revenue was more like \$6 million, and 1984 revenue was about \$7.2 million. Profits were more than \$1 million in 1984, according to Kutnick, but he said revenue will probably be flat this year.

Anderson later said revenue estimates vary based on accounting assumptions. On a cash-in basis, he said, the company recorded \$7.7 million in 1984 and expects to hit \$10 million this year. May "was the best month we ever had," according to Anderson. Competitors, he charged,

record as sales the fees that will be accruing in future years.

Another relatively new wrinkle is Anderson's creation of a venture capital firm, Batterymarch Ventures. Anderson said he sees no potential conflict of interest from owning equity in companies involved in the area the Yankee Group covers because the investments are relatively minute.

"We have said the reason for [the venture capital firm] is that we want Yankee Groupers attuned to new technology, and how you take that technology and incorporate it into a business strategy," he said. "My guys are just a lot smarter about new software, new hardware, new applications." Competitors have similar venture funds, he said.

Asked to pinpoint the company's greatest achievements, Anderson recalled a 1974 report, "The Unbundling of AT&T," predicting a successful U.S. Department of Justice antitrust suit and restructuring of the telecommunications industry and a second report, "The IBM Grand Design, SNA." He also pointed to early analyses of the OA market.

Anderson said he could not recall any major mistakes. "I think part of the reason that we've grown is we've been right; if you're constantly wrong, you don't stay in this business." Kutnick agreed, saying any

See MART page 121

the YankeeGroup

Service	Description	User/Vendor Oriented	Price
Basic Planning Service	Prerequisite subscription for all clients; includes Yankeenet, consulting, seminars	Both	\$8,000
Yankeenet	On-line access to analysis of industry news and electronic mail system	Both	One-time subscription fee of \$1,900 includes 750 min. of use; each additional 250 min. costs \$150
INFORMATION PROCESSING GROUP			
Information Systems	DP/MIS strategic planning and implementation in large corporations	Both	\$4,500 each module plus cost of basic service;
Data Communications	Changes in demand for data communications	Both	\$26,000 for full services of this group
Office Systems	End-user computing environments and office systems requirements	Both	
Small Systems	Growing markets for small multiuser systems	Both	
COMMUNICATIONS INDUSTRY GROUP			
Communications Systems and Services	Forces shaping decisions in building public and private networks	Both	\$4,500 each module plus cost of basic service;
Enhanced Network Services	Network applications provided through value-added networks	Both	\$26,000 for full services of this group
Data Communications	Changes in demand for data communications	Both	
Office Automation Communications	User requirements and technologies for connectivity of office systems	Both	
Manufacturing Automation Planning Service	Design, strategies and use of factory systems	Both	\$15,000; includes Yankeenet
Home of the Future	Technology and trends of consumer electronics; consumer buying behavior	Vendor	\$15,000; includes Yankeenet

Source: Yankee Group, Inc.

Stratus continuing to seek OEM pacts: president

By Clinton Wilder
CW Staff

BOSTON — Stratus Computer, Inc. has charted a new direction in the fault-tolerant computer market — a market that will change significantly in the coming year, according to Stratus President William E. Foster.

Foster, addressing shareholders at the company's annual meeting here recently, said Stratus will continue to seek OEM partnerships such as its unprecedented agreement with IBM, signed in January. He predicted that Big Blue's first foray into the fault-tolerant market would help Stratus not only because of its OEM sales to IBM but also because IBM's action elevates the status of the entire fault-tolerant industry.

"We have already seen some major potential end users who want to hear more about us since the IBM agreement," Foster said. "Anytime IBM enters a new market, people ask why."

Stratus, which had previously signed OEM agreements with major vendors such as Ing. C. Olivetti & Co. and Burroughs Corp. subsidiary Systems Development Corp., announced an OEM partnership with Digital Switch Corp. The multimillion-dollar deal calls for Digital Switch, based in Richardson, Texas, to incorporate Stratus/32 computers in its Network Control Center communications switching system. "Stratus has targeted the communications industry for aggressive marketing in 1985 and beyond," said John P. Morgridge, Stratus' vice-president of marketing.

"We feel the way you grow in the

1980s is by looking at different ways to leverage your sales force, primarily because of the increased cost of people," Foster said. "This summer, we will begin a major new campaign to develop third-party agreements."

Foster said alternative sales channels, such as OEMs and third-party software developers, currently account for 21.3% of Stratus' revenue. The only larger single-market segment is brokerage houses, which account for 24.1% of the company's sales. Stratus posted revenue of \$42.1 million in 1984, making it the second largest fault-tolerant vendor, behind Tandem Computers, Inc.

Company officials refused to disclose the number of units that have

been sold to IBM since the January agreement. "We have a very good working relationship with IBM," said Nicholas Bologna, Stratus' vice-president of product marketing, formerly an IBM employee for 13 years. "We're not involved in their marketing, but we expect they will move cautiously at first."

Stratus admits that the IBM agreement may not directly impact Stratus sales until 1986, and industry observers agree. "IBM has said [it] will not announce until the end of this year how [it] will utilize [its] sales force for the Stratus product," said Los Altos, Calif.-based analyst Omri Serlin, editor of "FT Systems," a monthly fault-tolerant industry

newsletter. "The deal is a double-edged sword. It certainly enhances Stratus' reputation, but if IBM decides to market it aggressively, that could overwhelm Stratus' production capability."

Foster predicted that the demand for fault-tolerant systems will increase as the need for on-line transaction processing becomes greater. "Most new applications are on-line, which means the costs of system failures are much greater for the user," he said.

Stratus' first-quarter revenue of \$15.2 million was double that of the year-earlier quarter. The company earned \$1.5 million, or 8 cents per share, for the period ended March 31.

Disk vendors plan closings

Magnetic Peripherals, Inc. (MPI) will close a 450-employee disk drive plant, and Memorex Corp. will idle nearly all of its domestic operations for two weeks next month, it was announced recently. The two unrelated announcements signified the continuing slump in the computer peripherals business.

MPI, jointly owned by Control Data Corp., Sperry Corp., Honeywell, Inc. and Bull, will begin to close its disk drive assembly and test plant in Burnsville, Minn. Most of the 450 employees will be transferred to two MPI facilities in Bloomington, Minn. CDC, MPI's majority owner and managing partner, termed the move a "consolidation" and said CDC's Government Systems Division will move into part of the facility.

MPI also said most of its domestic operations will be shut down for two weeks beginning July 1. Many employees will be allowed to use the shutdown period as paid vacation time, the company said.

Memorex announced it will idle 90% of its U.S. operations for the same two-week period. The shutdown will close its large disk storage and communications peripherals manufacturing plant in Santa Clara, Calif.

MPI and Memorex said the actions were caused by sluggish demand for their disk drives.



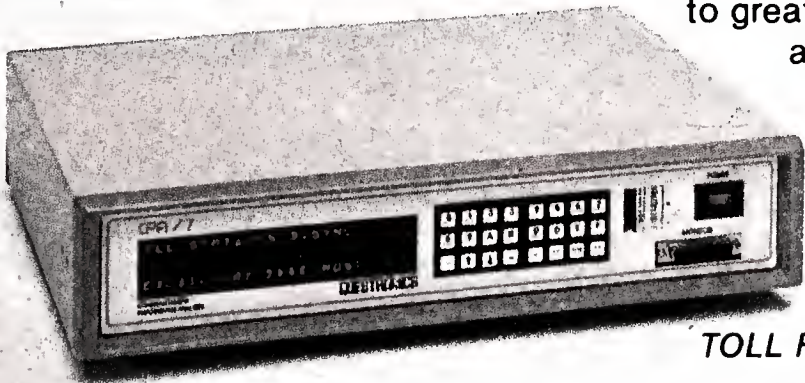
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COMPUTER INDUSTRY

Terms of assurance: Lotus customer plan poses catch-22



OUTSIDE LINES

L. J. Kuttan

A major problem in the computer industry is that small companies grow into big ones so fast that they forget the customer is the reason for their ex-

pansion and growth.

In the course of that growth, companies often develop something called "chutzpah." Chutzpah is a Yiddish word meaning gall. It is used to describe someone who does something so outrageous that it is unbelievable. Recently, Lotus Development Corp. did something that set a new record

for corporate chutzpah.

Last month, I went to my local software store and examined Lotus' 1-2-3 package. The package was covered in shrink-wrapped plastic, and on the back was a page describing the program. At the bottom of the page was a paragraph titled "Conditions of purchase." It stated, in part, the following:

"This product is subject to limitations on warranty and permitted uses customary in the sale of microcomputer software for personal use. The details of such limitations are set forth in the Lotus Customer Assurance Plan which is available from Lotus or from your dealer."

Since 1-2-3 is an expensive program, and I am a cau-

tious consumer, I felt it was reasonable to find out what these terms were before buying the program. I asked the dealer, and he examined his Lotus file. There was no copy of the plan in it. But according to my dealer, Lotus' Customer Assurance Plan stated in detail its policies on customer support and product upgrade.

It also explained the details of Lotus' "limited warranty." I then asked him to open up a shrink-wrapped package. He refused, saying that opened packages are harder to sell. If I really wanted to see it, I would have to buy the program.

Not wanting to be bound by an agreement I had not read, I declined his offer. I then tried two other authorized Lotus dealers and met with the same result; no one had a copy of the Customer Assurance Plan available for customer inspection.

Letter to Lotus

Taking Lotus' statement literally, I wrote a letter asking for a copy of the plan. One week later, a Lotus representative called and asked why I wanted the copy.

I replied that I had read the firm's conditions of purchase on the 1-2-3 package, none of the local dealers had a copy of the Customer Assurance Plan available for inspection and I wanted to know the terms of the agreement.

I was promptly informed that it was Lotus' policy not to mail out copies of its Customer Assurance Plan. While the representative would tell me its terms over the phone, the only way to get a hard copy was to buy the program.

This shocked me. Never before had any company refused to send me a copy of its product warranty. I do not know why Lotus refused. Maybe its Customer Assurance Plan is so one-sided that Lotus does not want me or any consumer to see it until we have made the emotional and financial commitment to buy 1-2-3.

All I can do now is speculate why Lotus refused and hope this policy does not spread to other software and hardware companies.

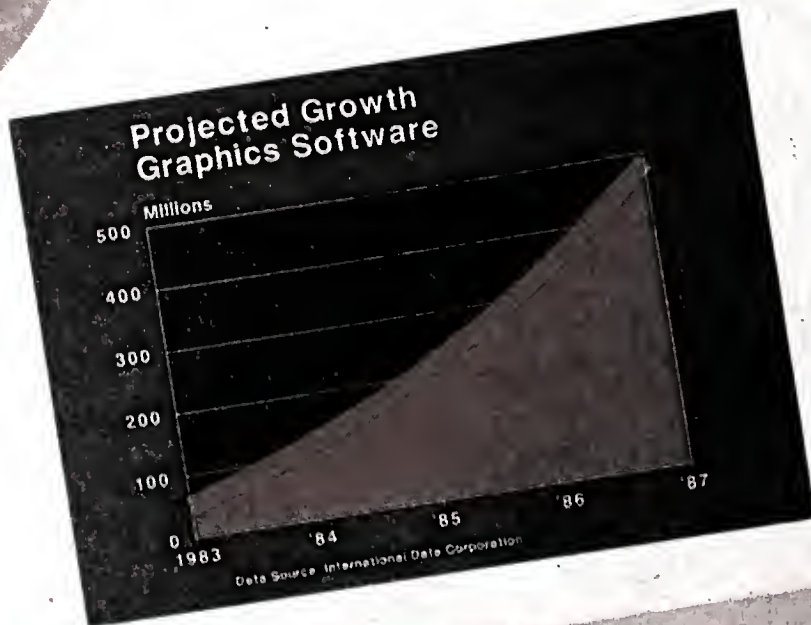
Editor's note: After completing this article, Kuttan reported that on his fifth visit to a dealer, he was able to view a copy of the warranty.

Kuttan is a frequent Outside Lines contributor who specializes in computer law topics. He is a member of the Illinois and Missouri bars. His book, *Computer Buyer's Protection Guide*, was published last year by Prentice-Hall, Inc.

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COMPUTER INDUSTRY

Chip slump forces firms to cut staff

Two companies that sell capital equipment to semiconductor manufacturers recently announced work force reductions because of the continued slump in the semiconductor industry.

GCA Corp. of Bedford, Mass. laid off approximately 250 employees, or 7% of its U.S. work force, mainly from its Massachusetts-based semiconductor products division.

Fremont, Calif.-based Optical Specialties, Inc. (OSI), a maker of automated inspection and measurement systems for the industry, laid off more than 20% of its 240 employees. In the announcement of the 50 dismissals, OSI cited the recent cancellation of a \$550,000 order and continued overall sluggishness in the semiconductor industry.

Industry recovery delayed

GCA President Richard D. Stewart said the company is scaling back its production rate of semiconductor-related components to 1984 levels.

According to Stewart, "GCA has recently seen mounting indications that the [semiconductor industry] recovery is being delayed and that substantial bookings of products [that] GCA had anticipated in the coming weeks are being delayed as well."

GCA announced the possibility of posting a second-quarter loss because of costs associated with the layoffs and the potential of shipping fewer DSW Wafer Stepper systems than originally planned.

The company expects to post profits in the third and fourth quarters, but not enough for 1985 results to match its earnings and sales of the previous year.

Sales to continue

Both GCA and OSI said they will continue with previously announced plans for selling to the semiconductor factory automation market. "Although most semiconductor manufacturers have temporarily postponed expansion plans, they are forging ahead with the next phase of factory automation," OSI Chairman and President Ken Snow said.

OSI said it expects sales in the third and fourth quarters to lag second-quarter revenue of \$4.8 million.

In a related development, Wyle Laboratories, a maker of semiconductors as well as military and aerospace electronic components, reported a sharp drop in first-quarter revenue.

The El Segundo, Calif.-

based firm said sales fell to \$71.3 million from \$93.1 million in the year-earlier quarter. Profits plummeted from \$3.2 million, or 42 cents per share, in the first quarter of 1984 to \$505,000, or 7 cents per share, for the period ended March 31.

AT&T, firms plan money services

NEW YORK — A joint venture to develop electronic banking and brokerage services was announced here last week by AT&T, Bank of America, Chemical Bank and Time, Inc.

The joint venture reportedly will develop, produce and market electronic banking and brokerage services as well as other electronic ser-

vices to consumers and small businesses.

The services are expected to begin operation in New York and California this summer, after receiving regulatory approval, according to representatives for the companies.

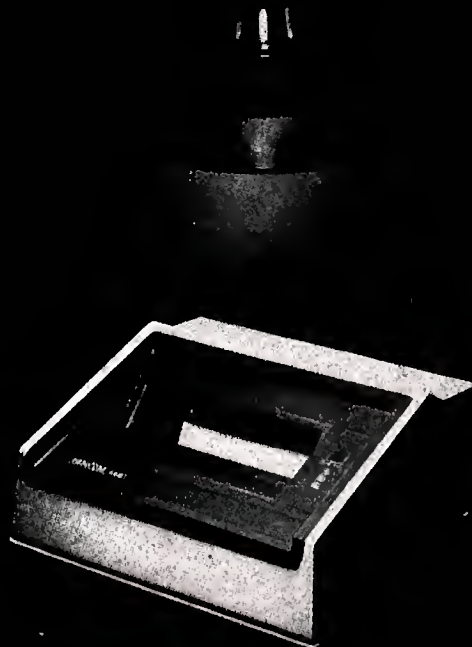
Initially, the electronic banking venture will offer services to approximately

37,000 homes and small businesses that currently subscribe to Chemical Bank's Pronto service and Bank of America's Homebanking service.

Francis J. Heffron, executive vice-president of AT&T Technologies, Inc., was named chairman and chief executive officer of the venture.

We've been starting a

Introducing the new Genicom 4000.
The line printer that offers you
a big payoff, keeps things quiet and
refuses to break under pressure.



COMPUTER INDUSTRY

Softech to sell micro subsidiary

WALTHAM, Mass. — Softech, Inc., a mainframe and micro software firm based here, recently announced plans to sell off its microcomputer software subsidiary, Softech Microsystems.

Softech has curtailed operations of the subsidiary, pending its sale. The company claims the decision will not affect continued product sales or sales support.

"Continuing this operation would involve a more intensive marketing effort and a greater degree of risk than Softech is pre-

pared to undertake," said Softech President Justus F. Lowe Jr.

"We are exploring possibilities for selling or licensing our microcomputer product lines to a company which specializes in this market, such as a major brand-name supplier, publisher or catalog distributor," according to Lowe.

Softech said the decision would mean a loss of \$4.1 million before taxes, or 48 cents per share, to be taken as a one-time write-off for the quarter ended May 31.

Anacomp reaches accord with creditor; loan reduced

INDIANAPOLIS — Anacomp, Inc. recently announced it had reached an agreement with its creditor banks, reducing its term-loan balance to \$33 million.

Under the agreement, the maturity of the term loan was extended by 15 months to Sept. 30, 1987 and the in-

terest rate was lowered by 1¼%.

Anacomp, which ran into severe financial difficulties in its attempts to develop a comprehensive banking software package, said the agreement will reduce its annual interest expense by more than \$2 million.

Louis P. Ferrero, chairman and president, said the agreement demonstrates creditor confidence in the company and "enhances our prospects [for] continued overall earnings improvements."

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Cullinet, M&D bout continues

NATICK, Mass. — Round 2 is under way between McCormack & Dodge Corp. and Cullinet Software, Inc. over M&D's proprietary G/L Plus general ledger software.

A counterclaim has been initiated by M&D after an original suit was decided in its favor. Cullinet, which had filed the original suit, is in the process of appealing the Massachusetts Superior Court's ruling. M&D is now seeking to cancel its entire agreement with Cullinet, an M&D spokesman said.

Cullinet originally sublicensed the G/L Plus software in 1981 from M&D, which provided them with version 1.7.1 of the system. M&D, however, only agreed to allow Cullinet to sell the system to users of Cullinet's IDMS system within the U.S. and Canada, according to Frank Dodge, M&D president and chief executive officer.

The dispute centers on Cullinet's practice of selling the software overseas, Dodge said. Soon after the complaints began, Cullinet sued for a declaratory statement against M&D, claiming the 1981 deal entitled Cullinet to promise international clients the G/L Plus software as of 1986 — five years from the date of the original pact. After the court's scrutiny of this agreement, M&D emerged victorious on the merits of its original pact with Cullinet.

What will happen to users who bought the G/L software from Cullinet? "They will not be affected," said Cullinet spokesman Bob Hughes. Furthermore, Hughes said, "We will have a general ledger available for the international market." Hughes refused to comment on whether Cullinet would invent or buy its general ledger.

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Dataserve announces 5% 1984 revenue dip

HOPKINS, Minn. — Dataserve, Inc., a lessor and marketer of new and used IBM equipment, recently announced 1984 worldwide revenue of \$109.9 million, down 5% from \$115.9 million in 1983. The company said the decrease was primarily due to a shift in recording revenue from leases.

Profits for the year were \$2.1 million, or 8 cents per share, up from \$1.3 million, or 7 cents per share a year earlier, according to Dataserve.

Dataserve said it shifted its leasing business from sales-type leases to operational-type leases, resulting in revenue being recognized over the term of the contract rather than at the inception of the lease.

Of the total revenue, \$45.5 million was generated by European activities, where the company operates under the name of Premier Computer.

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The Telex Corp. reported revenue for the fourth quarter ended March 31 of \$172 million, compared with \$94.4 million in the same quarter a year ago. Profits after income taxes were \$15.7 million, or \$108 a share, compared with \$1 million, or 69 cents per share, in the corresponding period a year ago.

T-Bar, Inc. announced revenue for the first quarter ended March 31 of \$9.5 million, compared with \$9.8 million a year ago. Profits were \$310,000, or 7 cents per share, compared with \$624,000, or 15 cents per share in the same quarter one year ago.

Uccel Corp. reported revenue for the first quarter ended March 31 of \$46.1 million, compared with \$39 million in the like period last year. Profits were \$1.5 million, or 9 cents per share, compared with \$619,000, or 4 cents per share a year ago.

Kearney-National, Inc. announced revenue for the first quarter ended March 31 of \$51.8 million, compared with \$49.7 million in the prior year. Profits from continuing operations for the first quarter were \$2.4 million, or 43 cents per share, compared with \$2.6 million, or 46 cents per share in the comparable period last year.

Symbolics, Inc. reported revenue for the third quarter ended March 31 of \$18 million, compared with \$10.4 million a year ago. Profits were \$1.2 million, or 6 cents per share, compared with \$132,000, or 1 cent per share in the like period one year ago.

Protocol Computers, Inc. reported a net loss for the second quarter of \$325,000, or 6 cents per share, on revenue of \$2.7 million, compared with a net income of \$420,000, or 8 cents per share, on revenue of \$4.5 million for the comparable period a year ago.

MART from page 112

failures were more a matter of wrong timing, such as predictions of growth in local-area networks. However, Kutnick said, "These things are so hedged by all the research companies that any major errors are somewhat blanded."

Anderson professed a degree of frustration with the speed with which vendors and users progress technologically but admired the development of microcomputers and related software. "We are always frustrated that the users aren't making the decisions as rapidly as it becomes obvious to us that they [should]," he said.

Boole & Babbage, Inc. announced the final unaudited results of operations for the second fiscal quarter ended March 31. The company reported a loss of \$407,000, or 13 cents per share, on revenue of \$7.3 million, compared with profits of \$468,000, or 16 cents per share, on revenue of \$7.5 million in the comparable period one year ago.

Ask Computer Systems, Inc. reported revenue for the third quarter ended March 31 of \$19.1 million, compared with \$17.5 million in the like period a year ago. Profits were \$1.7 million, or 14 cents per share, compared with \$1.7 million, or 15 cents per share last year.

Equitable Life Leasing Corp. announced revenue for the three months ended March 31 of \$38 million, an increase of 52.9% over revenue of \$24.9 million in the corresponding quarter last year. Profits were \$2.9 million, a 23.3% increase over \$2.4 million reported in the comparable period one year ago.

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COMPUTER INDUSTRY

Honeywell adds systems service

SAN JOSE, Calif. — Honeywell, Inc. reportedly will provide nationwide service for the complete line of Convergent Technologies, Inc. computer workstations and multiuser systems, it was announced recently.

The companies signed a multiyear contract providing for on-site maintenance for all Convergent Technologies hardware products and toll-free user access to Honeywell's National Response Center.

Paul C. Ely Jr., president and chief executive officer of Convergent Technologies, said the pact will make his company's products more attractive to OEMs with limited service capabilities.

Honeywell's third-party service program has 3,700 service technicians in more than 250 locations.

ACM appoints Hespos director

NEW YORK — The Association for Computing Machinery (ACM) recently appointed Richard F. Hespos as executive director.

Hespos is a former vice-president of DP, strategic planning, real estate and administrative services for Continental Corp. Hespos had previously served as vice-president of technology at Dun & Bradstreet, Inc. and was a management consultant for McKinsey & Co. He is on the board of directors of Quotron Systems, Inc.

Hespos will replace Sidney Weinstein, who retired from ACM after 10 years of service.

New York-based ACM is an educational and scientific society comprised of more than 75,000 computer specialists.

TANDON

from page 111

products into the U.S.

The ITC must decide on Harris' recommendation within 90 days. Tandon said it expects the ITC to follow the judge and grant temporary relief, pending Harris' decision on permanent relief by the end of October.

In past patent infringement cases, the ITC has required accused firms to post bonds as high as twice the value of their import shipments.

The current case is the second international trade complaint filed by Tandon this year.

The Chatsworth, Calif.-based firm had earlier charged several Korean disk drive companies with misappropriation of trade secrets, industrial espionage and other unfair trade practices.

Harris ruled in April that he believed there were no grounds for the charges, but the final decision is still pending before the ITC.

Tandon has been hit hard financially in the last two quarters, losing a total of \$35.3 million on sales that fell more than 20% from the six-month period a year earlier. The company has announced plans to lay off 370 employees, thereby decreasing its domestic work force 25%.

Eikonex accepts Kodak stock bid

ROCHESTER, N.Y. — Eastman Kodak Co. recently announced that shareholders of Eikonix Corp. had voted to approve Kodak's proposed acquisition for \$16.12 per share.

Eikonix, the Bedford, Mass.-based manufacturer of digital image processing equipment and computer-aided electro-optical systems, will operate as a wholly owned subsidiary of Kodak's Commercial and Information Systems Group. Saul Kurlat, president and chief executive officer, and Jack D. Finley, chairman and executive vice-president, will remain with Eikonix in those capacities, Kodak said.

AIM facilities shut down for two summer holidays

MILPITAS, Calif. — Applied Information Memories (AIM) recently closed its corporate offices and one manufacturing facility for one week and will close again for the week of July 1.

Donald Brosnan, president of the disk drive manufacturing company, said the action was triggered by the "need to get our expenses more closely in line with our revenues." Brosnan said that the shutdowns were an alternative to employee layoffs.

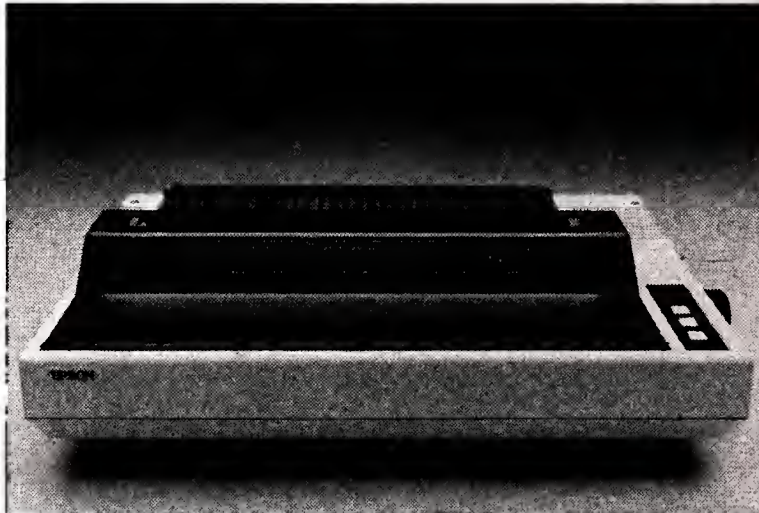
AIM's manufacturing plant, located in Round Rock, Texas, as well as

the corporate offices located here were closed during the holiday week of May 27 and will close again the week of July 1 because of the Independence Day four-day workweek. Employees reportedly are being paid for the two holidays.

The three-year-old disk manufacturing firm employs 125 workers in the Texas plant and 68 workers in the offices located here. The venture capital-funded company said it has received contracts totaling more than \$55 million in the past three months for its new 5¼-in. disk drive, the Dart-130.

My, how printers

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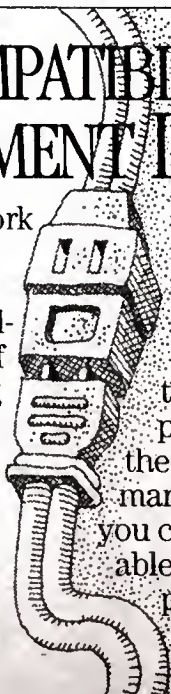
And Epson printers are famous for being able to take those odd little bumps and crashing falls that render other equipment useless.

As for our full year warranty, well it's reassuring to have. But nobody seems to need it.

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Not all printers work with all computers. Or all software.

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For most people, reading a printer manual is like hard labor. But it's important if you want to get the most out of your printer. We've been working to make our manuals as user friendly as our printers.

ASK shareholders file suit, cite misleading statements

LOS ALTOS, Calif. — Two shareholders have sued Ask Computer Systems, Inc., charging the company with releasing misleading statements about the company's financial condition.

In two separate suits filed recently in U.S. District Court in San Jose, Calif., the shareholders, Edward Fein and Stuart Weschler, claimed that in a prospectus for a \$1.6 million stock offering in February, Ask presented itself as a "healthy, growing company," and failed to include information about product shipping delays that reportedly contributed to a

third-quarter revenue slip. Ask revealed in April that its third-quarter revenue would be lower than expected.

Revenue for the third quarter ending March 31 was \$19.2 million, down from second-quarter revenue of \$21.2 million. Third-quarter profits were \$1.7 million, or 15 cents a share, compared with year-earlier earnings of \$1.8 million, or 14 cents per share.

In a prepared statement Ask Chairman Sandra Kurtzig said, "The company intends to vigorously contest the action."

APPLE from page 111

In a prepared statement released May 31, Sculley said Apple plans to streamline its operations and "create a more efficient organization" by merging its Apple II and Macintosh product divisions.

With the consolidation, Jobs, who founded Apple with engineer Steve Wozniak in the late 1970s, lost his position as general manager of the Macintosh division.

'A more global role'

Jobs, who remains chairman of the board, will take on "a more global role in new product innovations and strategies," Sculley's statement said.

Del Yocam, formerly general manager of the Apple II division, was appointed to oversee the firm's product operations worldwide. In his new po-

sition, Yocam will be responsible for manufacturing, product development, operations management and distribution for all Apple products.

Analysts predicted that the consolidation will help alleviate the negative competition that reportedly existed between the two divisions. "Obviously, anything that will take away from that internal strife is a big plus," Bajarin said.

In his announcement, Sculley said the reorganization would allow Apple to focus its resources on its two primary markets: the education market and small- to medium-size business market.

Peter Teige, an industry analyst with Dataquest, Inc., a San Jose, Calif.-based market research firm, said Apple appears to be downplaying its much-publicized attempt to break into the corporate market.

Teige said the decision is a sound one. "The reorganization is a really good move for Apple because it is pointing to its market strengths," Teige said. "The company hasn't given up on the corporate market, but at least in the short term it is emphasizing its strengths."

Company playing to its strengths

The company is also playing to its strengths by moving Jobs out of day-to-day operations, according to Teige. "I think he has shown himself to be a very able leader in managing innovative technology and bringing it to market," Teige said. "It's hard to know ego-wise what the change will mean to Jobs, but for Apple it could be very positive," he added.

Apple's recent announcement is the firm's latest move to cut costs and improve the company's management. In recent months, Apple has laid off more 1,600 workers, closed its factories for a week, discontinued its Lisa computer and closed the doors of its disk drive production plant.

In addition to coping with internal problems, Apple, like other personal computer companies, is struggling to survive the current industry slowdown, the analysts said.

"With the situation Apple is in, it needs margin and profit from wherever it can get it," said Ralph Gilman, an analyst with Infocorp, a Cupertino, Calif.-based market research firm.

"It has to get itself focused on getting its products out to market and getting its dealers selling the Macintosh Office. If this reorganization helps Apple do that, it's a positive development," Gilman said.

LAYOFF from page 111

The company said it would furnish several services to help its dismissed workers find new employment.

James Barlage, a semiconductor industry analyst with Smith Barney, Harris Upham & Co., said the National Semiconductor announcement may bode ill for other chip companies that had also previously resisted layoffs.

"Many of the [San Francisco Bay] area companies have been reluctant to lay off people because the people tend to evaporate," Barlage said. "So this is really a lag response to what's been happening in the industry."

"I don't think we're going to see much improvement until the fourth quarter at the earliest, and we could well go through most of next year the same way," he said.

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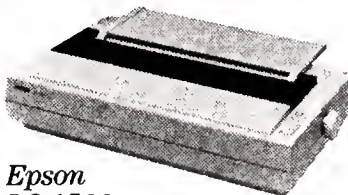
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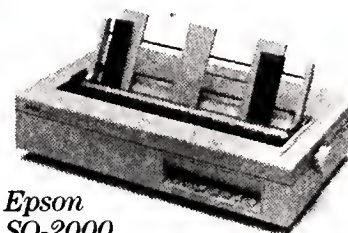
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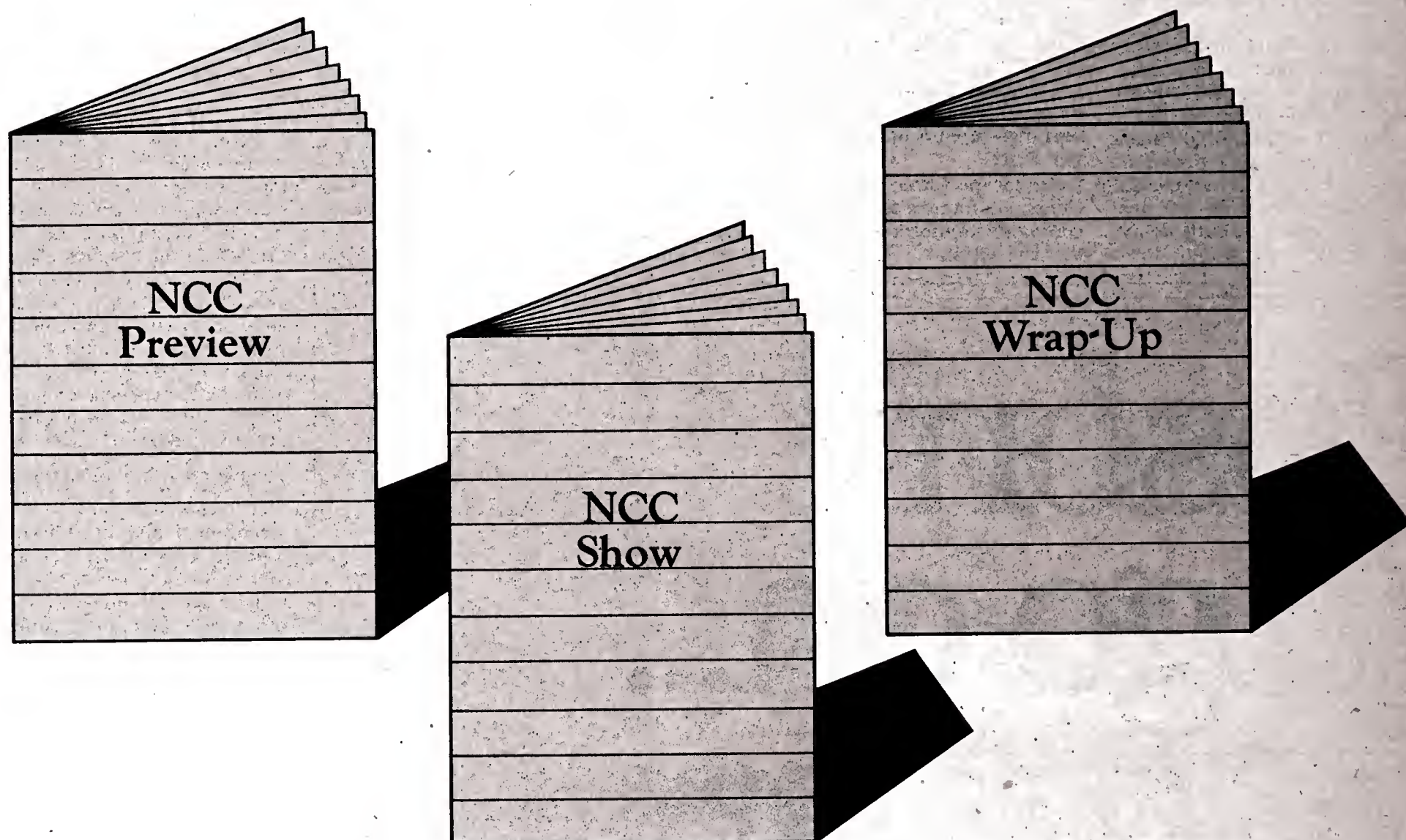
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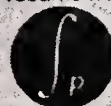
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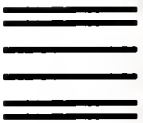
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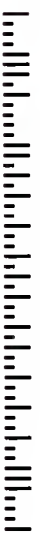
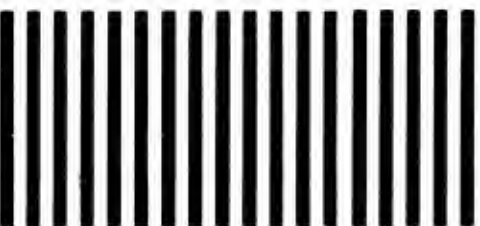
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S.C. Tax Commission

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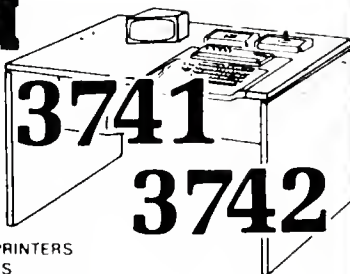
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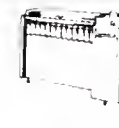


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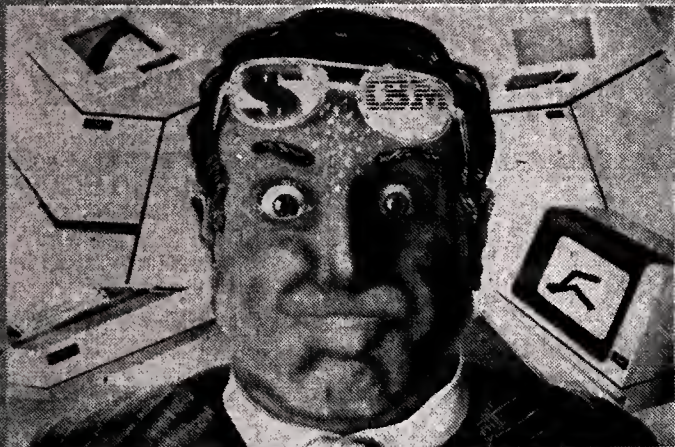
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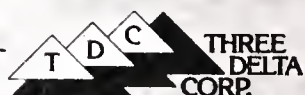
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ADVERTISERS INDEX

Accountants Microsystems Inc.	88
AFIPS	ID/32
Altos Computer Systems	90-91
Anderson Jacobson	ID/31,93
AST Research	107
AT&T Information Systems	44-45
Avatar Technologies	11,13
B I Moyle Associates, Inc.	106
Backus Data Systems	42
Banyan Systems	68-69
Boeing Computer Services	102
BRS/Search	ID/21
California Software, Inc.	4
California Software Products, Inc.	62
CMI Corp.	ID/2
Codex Corp.	77
Collier-Jackson, Inc.	92
Comdisco, Inc.	63,117
Computer Corporation of America	23
Concord Data Systems	ID/13
Control Data Corp.	ID/28-ID/29
CPT, Inc.	22
Cullinet	71
CW Corporate	ID/30
CW Denmark	ID/31
CW Japan	106
CW NCC Daily!	72
CW NCC Daily!/Special Report	124
D & B Computing Services	ID/7
Data Entry Management Assoc.	ID/26
Datagram	98
Datapoint	43
Datasouth Computer Corp.	ID/12
Dayna Communications	30-31
Diebold Inc.	12
Digital Communication Associates	82-83
Digital Equipment Corp.	26-27
E + E DataComm	ID/18
Eastman Kodak Co.	34
Epson America	122-123
Equinox Systems	92
Fox Research, Inc.	ID/11

Fusion Products	ID/13
Genicom	118-119
Genix	88
Goal Systems	ID/8
Graham Magnetics	110
Group Operations, Inc.	ID/22
H & M Systems Software, Inc.	56
Hamilton Rentals	104
Hayes Microcomputer	84-85
Hewlett Packard	78
Honeywell Information Systems	ID/16-ID/17
IBM	ID/27,108-109
ICCS	121
Infodata Systems	73
Information Technologies, Inc.	74
Intel	ID/4-ID/5
ISSCO	116
ITT Courier	114-115
ITT Information Systems	67
Landmark Systems Corp.	96
Lear Siegler, Inc.	ID/14
Leasametric	48
Lee Data Corp.	89
LeeMAH	80
McCormack & Dodge	35
McDonnell Douglas	10
Michaels, Ross & Cole	ID/14
Micro Data Base Systems, Inc.	ID/3
Mike Murach & Associates	9
MSA	144
MTI Systems Corp.	6,8
NCR - ADDS	70
NCR Comten	19
NCR Corp.	38-39,100-101
Netec	ID/22
Novell, Inc.	81
NYNEX	14-15
Oracle Corp.	47
Paradyne	54

PC Expo	76
Philon Inc.	86-87
Quadram	32
Questronics	113
Qume	25,120
R Systems, Inc.	ID/6
Racal-Milgo	94-95
Realia Inc.	ID/20
Rolm Corp.	28-29
SAS Institute	20-21,24
SDI	97
SICOB 85	13
SKK, Inc.	66
Software International	103
Southern Systems	5
Sperry Corp.	55
SPSS, Inc.	ID/23
SSCP	121
Storage Technology Corp.	46
Sun Microsystems	57-61
Syncsort	3
Sysed	121
Tektronix Inc.	52-53
Teletype Corp.	99
Telex	36-37
Tone Software	92
Trax Softworks, Inc.	50
Triangle Software	ID/24
Tymnet	49,51
Unilease Computer	17
Universal Data Systems	ID/10
USL Data Systems	79
Verbatim Corp.	ID/19
Virtual Microsystems Inc.	18
VM Software, Inc.	7
Wang Laboratories	33
XA Systems Corp.	121
Xerox Corp.	64-65

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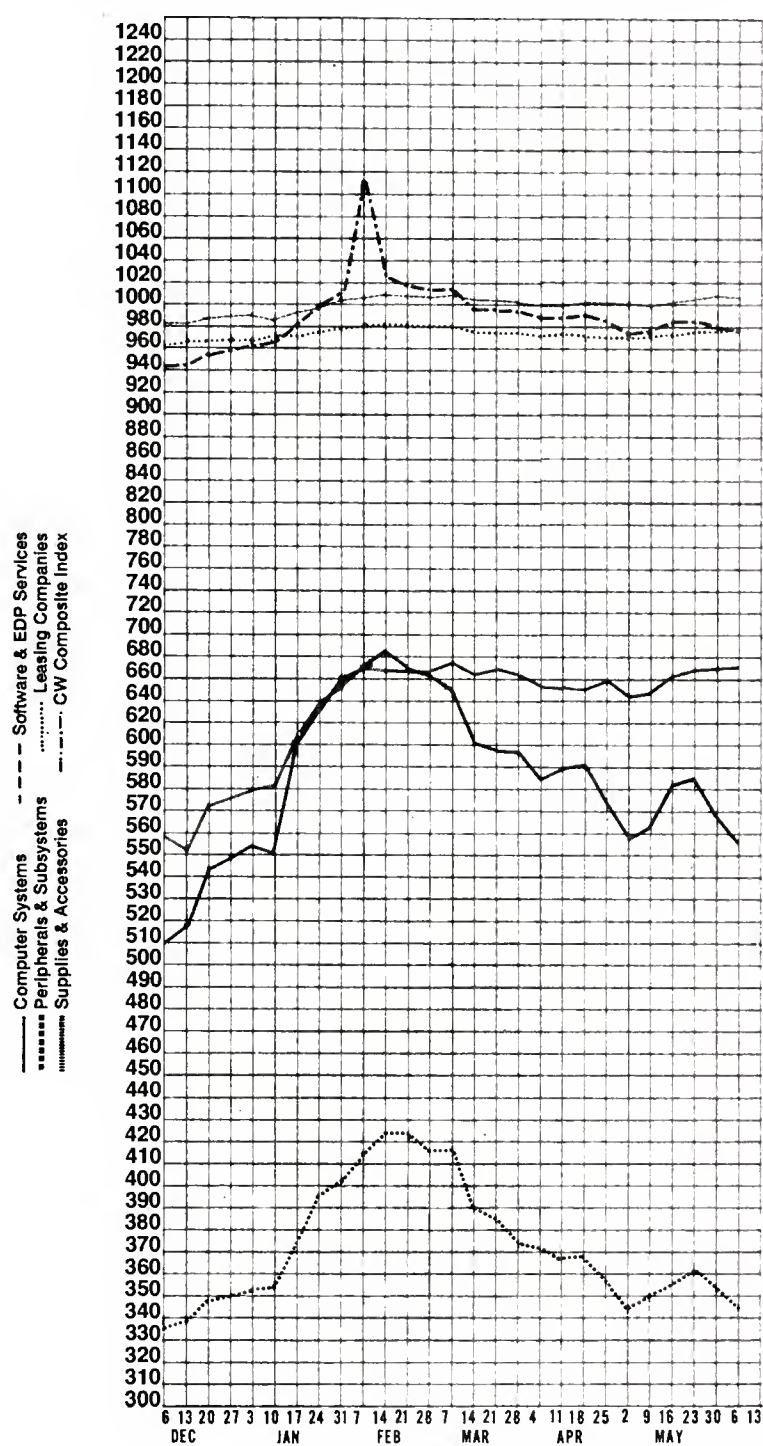
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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 5, 1985

All statistics compiled,
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TRADE QUOTES

E X C H		PRICE			
		1985 RANGE	CLOSE JUNE 5 (1)	WEEK NET CHNGE	WEEK PCT CHNGE
		COMPUTER SYSTEMS			
O	ALPHA MICROSYSTEMS	8-24	8 1/4	+ 1/4	+4.1
O	ALTO COMPUTER SYST	7-21	10 7/8	- 1/4	-2.2
A	ANDALM CORP	10-15	12 3/4	- 7/8	-6.4
O	APPLE COMPUTER INC	17-63	16 7/8	- 1/4	-1.4
N	AT&T	15-24	23 3/4	+ 1/2	+2.1
N	BURROUGHS CORP	48-86	62 1/2	- 3/4	-1.1
O	COMPAQ COMPUTER CP	4-15	8 7/8	+ 1/8	+1.4
O	COMPUTER AUTOMATION	3-17	1 1/2	- 1/8	-1.8
O	COMPUTER CONSOLES	7-20	7 1/4	- 1/8	-1.0
N	CONTROL DATA CORP	25-38	31 1/2	+ 3/8	+1.2
O	CONVERGENT TECHNOL	5-41	8 3/4	+ 1/8	+1.8
N	CRAY RESEARCH INC	39-82	77 1/2	- 4 1/2	-5.4
N	DAISY SYSTEMS CORP	14-36	24 1/4	0	0.0
N	DATA GENERAL CORP	34-74	34	-3 1/4	-13.3
N	DATAPoint CORP	12-26	13 1/2	+ 1 3/8	+11.3
N	DIGITAL EQUIPMENT	77-125	99	-8 1/2	-8.1
A	ECCO INC	12-18	14 1/4	- 1/8	-0.8
N	ELECTRONIC ASSOC.	3-7	4 5/8	- 3/8	-7.5
N	FLOATING POINT SYST	13-31	27 3/4	+ 1/8	+0.4
N	FOXBORO	28-36	27 3/8	- 5/8	-2.2
N	GOULD INC	20-32	21 3/4	-1	-4.3
N	HARRIS CORP	23-35	25 7/8	-1	-3.7
N	HEWLETT-PACKARD CO	31-44	32 3/4	- 7/8	-2.6
N	HONEYWELL INC	48-68	58 1/2	-2 5/8	-4.2
N	IBM	98-137	128 1/2	-1 1/4	-0.8
O	IPL SYSTEMS INC	1-14	1 3/4	- 1/4	-12.5
N	ITT CORP	21-42	32 1/8	- 3/8	-1.1
N	N/A-COM INC	13-24	18 3/4	- 1/4	-1.2
N	MANAGEMENT ASSIST	2-29	2 1/8	0	0.0
N	MATSUSHITA ELEC(ADR)	52-81	57 1/8	- 3/8	-0.8
N	MODULAR COMPUTER SYS	8-10	7	0	0.0
N	NOHAWK DATA SCI	3-17	2 7/8	0	0.0
N	MOTOROLA INC	29-44	30 3/4	-2 1/8	-8.4
N	NAT'L SEMICONDUCTOR	10-17	10 7/8	+ 1/8	+1.1
N	NOT INC	13-24	18 1/8	- 3/8	-2.2
N	NCR	21-31	25 1/4	- 3/8	-1.2
N	PERKIN-ELMER	18-30	23 1/4	-1 5/8	-8.5
N	PRIME COMPUTER INC	11-20	18 1/8	-1 3/4	-8.7
N	SPERRY CORP	35-54	51 5/8	-2 1/4	-4.1
O	STRATUS COMPUTER INC	8-17	14 3/4	+ 1/2	+3.5
O	TANDEN COMPUTERS INC	15-40	17 7/8	-2	-10.0
N	TANDY CORP	24-37	34 5/8	+2 1/8	+6.5
O	TELEVIDEO SYSTEMS	3-41	2 7/8	+ 1/4	+8.5
O	TELSON CORP	8-21	21 1/4	0	0.0
N	TEXAS INSTRUMENTS	88-150	98 1/2	+2	+2.2
A	ULTIMATE CORP	10-24	11 1/8	-1 1/2	-11.8
O	VECTOR GRAPHICS INC	0-8	1 1/2	0	0.0
A	WANG LABS "B"	15-32	15 1/4	-1 3/4	-10.2
A	WANG LABS "C"	16-32	15 1/2	-1 3/4	-10.1
N	XEROX CORP	35-50	50 1/8	+ 7/8	+1.7

LEASING COMPANIES

O	BOOTH FINANCIAL CP	10-22	18 1/4	0	0.0
A	CHI CORP	4-10	8 1/8	- 1/8	-1.3
N	COMISCO INC	8-17	14 1/8	- 3/4	-5.0
O	CONTINENTAL INFO SYS	3-18	10 7/8	+ 1/2	+16.0
N	DPP INC	15-18	18 7/8	+ 1/8	+0.8
O	FINALE GROUP INC	4-12	4 3/8	- 1/8	-2.7
O	PHOENIX AMERICAN INC	2-17	3 1/8	+ 1/2	+19.0
O	SELECTERN INC	8-21	8 1/2	- 1/4	-2.5
N	U.S. LEASING	28-44	38	+ 1/2	+1.4

COMPONENTS

N	ADVANCED MICRO DEV	25-41	25 1/8	-2 5/8	-9.4
O	ADV'D SEMICONDUCTOR	1-38	11 1/2	- 1/2	-4.1
N	ANALOG DEVICES INC	18-25	18 1/2	-1 3/4	-8.2
O	ANALOGIC CORP	10-31	13 1/4	- 3/4	-5.3
N	APPLIED MAGNETICS CP	9-21	13 3/8	- 3/4	-5.3
O	HAECO CORP	4-12	4 3/4	+ 3/8	+8.5
O	MICRO MASK INC	7-18	1 1/2	- 1/2	-8.8
N	TETRAHYNE	20-35	20 1/2	-2 5/8	-11.3

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=LOS ANGELES; N=NATIONAL; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST BID
(1) TO NEAREST DOLLAR

E X C H		PRICE				
		1985 RANGE	CLOSE JUNE 5 1985	WEEK NET CHNGE	WEEK PCT CHNGE	
		(1)				
		SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 8	3 3/4	- 1/4	-6.2	
N	ADVANCED SYSTEMS INC	9-22	10 5/8	+ 1/8	+1.1	
O	AOS COMPUTERS INC	10-32	13 7/8	+ 7/8	+8.7	
O	AMERICAN SOFTWARE	8-20	12 1/2	0	0.0	
N	ANACOMP INC	1- 5	3 3/8	- 1/4	-5.8	
O	ANALYSTS INTL CORP	5-17	10 1/4	+ 1/2	+5.1	
A	APPLIED DATA RES	18-38	34 1/4	-2	-5.5	
O	ASHOTON TATE	6-15	9 1/4	- 1/4	-2.6	
O	ASK COMPUTER SYSTEMS	13-24	14 1/2	- 3/4	-4.9	
B	ASTRADYNE COMP IND	1- 7	2 3/4	+ 1/8	+4.7	
N	AUTOMATIC DATA PROC	30-47	47 1/8	+1 1/8	+2.4	
O	COMPUTER ASSOC INT'L	15-35	23 3/4	-3	-11.2	
O	COMPUTER HORIZONS	8-20	9 5/8	+ 3/8	+4.0	
O	COMPUTER NETWORK	5-11	7 1/2	+ 1/8	+1.6	
N	COMPUTER SCIENCES	11-17	15 3/4	+ 1/4	+1.6	
O	COMPUTER TASK GROUP	8-16	15 1/2	- 3/4	-4.6	
O	COMPUTER USAGE	1-18	1 1/2	- 1/8	-20.0	
O	COMPUTONE SYSTEMS	4-23	6 1/2	- 1/8	-1.8	
O	COMSERV CORP	1-16	4	+ 1/8	+3.2	
O	COMSHARE	6-14	9 1/8	0	0.0	
N	CULLINET SOFTWARE	12-33	24 1/2	-1 5/8	-6.2	
O	CYCLARE SYSTEMS INC	18-27	23 1/2	- 1/2	-2.0	
O	HOBAN SYSTEM INC	5-27	4 1/2	0	0.0	
N	GENERAL ELECTRIC CO	48-65	62 5/8	+2 1/8	+3.5	
N	OELM MOTORS & EDS	33-78	77 5/8	-1 3/8	-1.7	
N	OTE CORP	36-45	42 5/8	+ 3/8	+0.8	
N	INFORMATICS GENERAL	14-27	25 1/8	+ 1/8	+0.8	
O	INFORMATION SCIENCE	2-17	2 1/2	- 3/4	-27.2	
O	INFOTRON SYSTEMS CP	15-43	21 1/4	0	0.0	
O	KEANE ASSOCIATES	8-18	17 1/2	+1	+8.0	
A	LODICON	18-34	32 7/8	+2 1/2	+8.2	
O	LOTUS DEVELOPMENT CP	15-40	28 1/2	-1 1/2	-5.0	
O	MCI COMMUNICATIONS	6-28	8 3/8	0	0.0	
O	MIND SCI ARKER INC	5-33	17 1/4	+1/2	+0.8	
O	MATHEMATICAL APP DAP	6-18	5 1/2	0	0.0	
O	NICOM SYSTEMS INC	15-50	16	-1 1/4	-7.2	
O	MICROPRO INT'L CP	2-10	2 3/8	- 3/8	-13.6	
O	NATIONAL DATA CORP	8-28	11 5/8	- 1/8	-1.0	
O	ON-LINE SOFTWARE INT	4-28	8 3/4	- 1/4	-3.5	
O	PANGOPHIC SYSTEMS	11-30	20 7/8	0	0.0	
N	PLANNING RESEARCH	10-15	13	+ 1/2	+4.0	
O	POLICY RENT SYS CP	22-38	24 3/4	0	0.0	
O	PROGRAMMING & SYS	4- 8	5 1/2	+ 1/4	+4.7	
O	REYNOLDS & REYNOLD	28-93	38	- 1/4	-0.6	
O	BEI CORP	11-34	18	+1 3/4	+10.7	
O	SHARED MEDICAL SYST	23-43	28 1/8	- 7/8	-2.5	
O	SCIENTIFIC COMPUTERS	5-14	6 1/8	- 1/8	-2.0	
O	SOFTWARE AG	9-21	14	-1	-6.6	
N	URS CORP	10-14	11	+ 5/8	+6.0	
N	UCCEL	7-17	14 1/8	+ 1/8	+0.8	

PERIPHERALS & SUBSYSTEMS

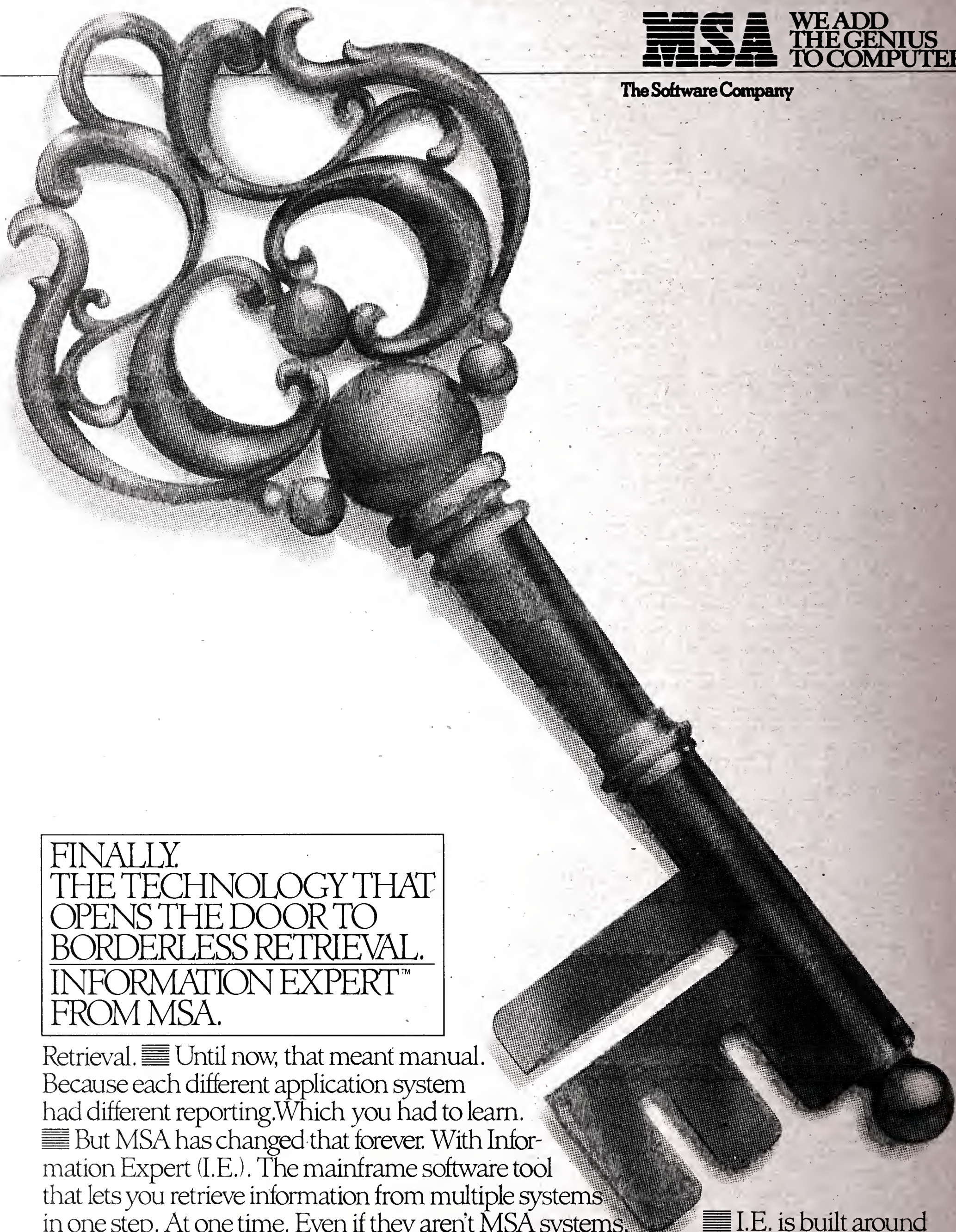
P	AN INTERNATIONAL	2-7	4 1/4	+ 1/4	+6.2
A	ANDERSON JACOBSON	3-11	3 3/4	- 3/8	-9.0
O	ABT RESEARCH INC	7-20	14 7/8	-2 1/8	-12.5
O	AUTO-TROL TECHNOLOGY	7-29	9 1/8	0	0.0
O	AVANT-GARDE COMPUTO	9-29	9	0	0.0
O	SANCTEC INC	5-22	8 3/4	- 1/4	-2.7
A	BEEHIVE INT'L	1-7	3 1/4	+ 1/8	+20.0
N	BOLT-BERANEK & NEW	17-30	25 3/4	- 1/2	-1.8
O	CARTEX CORP	1-3	1 3/4	+ 1/4	+3.5
N	CENTRONICS DATA COMP	3-14	2 7/8	- 1/8	-4.1
A	CETEC CORP	8-12	8 1/4	- 1/4	-3.8
A	COONITRONICS	4-8	5 7/8	- 1/4	-4.0

E X C H C H		PRICE				
		1985 RANGE	CLOSE JUNE 5 (1)	WEEK CHNGE	WEEK PCT CHANGE	
N	COMPUGRAPHIC COAP	26-37	27	0	0.0	
O	COMPUTER TANSCIEVEA	1-10	3/4	- 1/16	-7.0	
N	COMPUTERVISION COAP	14-46	13 1/2	- 3/4	-5.2	
N	CONAC COAP	11-17	13 1/4	- 1/4	-1.8	
A	DATAPRODUCTS CORP	11-25	10 3/4	- 3/4	-8.5	
A	DATARAM COAP	4-12	4 3/4	+ 1/4	+5.3	
O	DATA SWITCH COAP	4-41	4 3/4	- 1/4	-5.0	
O	DATUM INC	5-17	8 1/4	+ 1/4	+4.1	
O	DECISION DATA COMPUT	9-19	12	-1 1/8	-8.5	
O	DOCUTEL-OLIVETTI	3-39	5 1/4	0	0.0	
N	ELECTRONIC M & M	5-9	6 3/8	- 1/8	-1.4	
O	ENDATA, INC	3-18	3 1/4	- 3/4	-18.7	
O	EVANS & SUTHERLAND	11-50	16	+1 1/8	+7.5	
O	DANDALF TECHNOLOGIES	6-14	6 7/8	+ 1/4	+3.7	
N	GEN'L DATA COMM IND	13-20	14 1/4	- 7/8	-5.7	
N	HAZELTINE COAP	23-33	25 1/4	- 7/8	-3.3	
O	ICOT CORP	3-9	5 3/4	+ 1/8	+2.1	
O	INFORMATION INTL INC	10-19	13 1/4	+ 1/4	+1.8	
O	INTECOM INC	5-21	4 1/2	- 3/4	-14.2	
O	INTEL CORP	25-45	25 1/2	-1 1/2	-5.5	
A	LUNGY ELECTRONICS	7-14	13 3/4	- 1/8	-0.9	
O	MEMORATA CORP	3-8	5	- 1/2	-8.0	
A	MSI DATA COAP	8-19	7 7/8	- 1/4	-3.0	
N	NABA CORP	28-35	28 1/2	- 3/4	-2.7	
O	NETWORK SYSTEMS COAP	16-34	21 3/4	-2	-8.4	
N	NO AMERICAN PHILIPS	30-45	42 3/8	+2 1/8	+5.2	
N	NORTHERN TELECOM LTD	30-42	35 3/4	-1 5/8	-4.3	
O	ONE	1-6	1/8	0	0.0	
N	PARADYNE CORP	10-18	12	-1 1/4	-10.0	
A	PENRIL COAP	9-14	12	- 1/8	-1.0	
N	PLESSEY CO (ADA)	20-35	20 1/2	0	0.0	
O	PRINTRONIX INC	11-34	10 3/4	- 1/2	-4.4	
O	OSI INC	8-17	10	- 1/4	-2.4	
O	RAMTEC CO	4-23	4	0	0.0	
N	RECOGNITION EQUIP	8-17	8 1/4	- 3/8	-6.3	
N	RANDERS ASSOCIATES	32-51	33 1/2	-2 3/8	-6.6	
O	SCAN-TRON CORP	8-19	13 5/8	+ 3/8	+2.8	
N	SCIENTIFIC ATLANTA	9-14	11 1/4	- 1/8	-1.0	
O	SEAGATE TECHNOLOGY	4-20	6 1/2	- 3/8	-5.4	
N	STORAGE TECHNOLOGY	2-12	2 1/2	- 1/8	-4.7	
O	SYBEX DATATRONICS	1-13	3/8	-1/16	-9.1	
A	T BAA INC	8-11	6 3/8	+ 1/8	+2.0	
A	TAN PRODUCTS CO	13-20	18 1/4	+ 1/4	+1.1	
O	TANDEM COAP	4-35	5 1/4	+ 3/4	+6.8	
A	TEC INC	8-13	12	- 7/8	-8.7	
N	TEKTRONIX INC	52-88	58 7/8	+1 1/8	+1.8	
N	TELEX	19-47	38 3/8	-3 5/8	-8.6	
O	TELETYPE SYSTEMS CP	2-17	2 1/4	- 1/8	-5.8	
O	TEXTEL INC	17-23	17	0	0.0	
O	VISUAL TECHNOLOGY	1-28	3/4	- 1/8	-18.9	



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